TECHNOLOGY DEPT.

First Copy

A National Newspaper for Every Branch of the Industry

Automotive Daily News

CARS · SHOP EQUIPMENT · TRUCKS · AVIATION · PARTS · ACCESSORIES · TIRES

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PUBLIC LIBRARY
DETROIT

New Australian Tariff May Revive Canadian Car and Parts Industry

Treaty, However, Will Increase Present Duty Rates On Shipments Directly From the United States

TORONTO, Ont., July 14.—Possible revival of the Australian business of the Canadian automobile industry, particularly in tires and automobile parts, non-existent for some years because of an Australian tariff schedule favoring the United States, was seen last night as one of the principal benefits to Canada of the new Australian trade treaty.

Under the new treaty Canada gets an increased advantage on motor car chassis unassembled. The former rate was 22½ per cent. against Canada, and under the new agreement the rate will only be 15 per cent. while the general tariff was formerly 27½ per cent. it is now 32½ per cent., which applies to the United States.

Canada shipped $3,000,000 of motor car chassis unassembled to Australia last year, while the United States exported $16,500,000 to that country.

"The tariff change in favor of Canada is expected greatly to increase Canadian exports of motor car chassis unassembled but until the complicated schedules are worked out and compared with previous tariffs and the prevailing general tariff, it was said, it will be difficult to tell exactly how far Australia's concessions in this regard will go.

The new Australian rates on Canadian-made tires, bodies, parts and completed cars were definitely listed, however, among the items in the treaty favorable to Canada, and it is hoped that the tariff reductions will be sufficient to enable Canadian plants to recapture the

(Continued on Page 2)

HANCH PUTS NATION'S INSTALLMENT DEBT AT 2.8% OF INCOME

Chicago, July 14.—Less than three per cent. (2.8 per cent) of the annual income of the United States is "mortgaged" by installment sales, popular writers and after-dinner speakers to the contrary notwithstanding, according to C. C. Hanch, general manager of the National Association of Finance Companies, who, today, made public an analysis of the installment debt of the nation, prepared by Milan V. Ayers, analyst for the association.

"Offhand estimates by uninformed people have placed the mortgage on the future earning capacity of the American people as high as 20 per cent." said Mr. Hanch. "These estimates ignore the fact the last available statistics prepared by the National Bureau of Economic Research placed the total wages and salaries in the United States at $50,000,000,000 for 1928.

(Continued on Page 2)

Late News Flashes

Cleveland, O., July 14.—The Gabriel Company announces for the quarter ended June 30, after depreciation and other charges, a net loss of $30,508 and for the six months ended June 30 a net profit of $298, comparing with a net loss of $87,388 in the first half of 1930.

* * *

Tulsa, Okla., July 14.—The daily average oil production in the United States in the week of July 11 was 2,538,980 barrels, an increase of 55,555 barrels over the previous week, according to Oil and Gas Journal.

* * *

Flint, Mich., July 14.—Telegraph advices from Miami Beach, Fla., tell of the death there of J. R. Francis, founder of the Marvel Carburetor Company of this city, vice-president of Borg-Warner, Chicago, and president of the Francis Pharmacy Company of Indianapolis. Mr. Francis was 60 years old, and died in the Miami Beach Hospital after a year's illness. Burial will be at Indianapolis.

* * *

Buffalo, N. Y., July 14.—The Enterprise Oil Company of this city is one of nineteen concerns refining and marketing oil to be included in the marger under the name of the Quaker State Oil Refining Company of Oil City, announces Henry H. Hower, president of Enterprise. The merger involves more than twenty million dollars. Enterprise is the third oldest grease maker in the country, it is claimed, featuring duplex marine engine oil.

Mid-Western Dealers Expect Crop Sale to Boost Fall Trade

CHICAGO, July 14.—The banking fraternity in this city are conservatively optimistic as regards fall business prospects for the Middle West, particularly for the Mississippi Valley territory. This hopefulness for a moderate degree of prosperity in the autumn includes the automotive trade and the farm implement business.

While bankers are ready enough to talk, they generally decline to be quoted on any definite prophecy. One man, who is a leading figure in Chicago banking circles, recently said: "We are going to have bumper crops this year, better diversified than ever before. It is quite true that prices for farm products are low now and will still be low, in comparison with recent years, when the crops are harvested, but so are farm costs.

"Farm labor is lower than it has been in fifteen years and there has been plenty of it available. In my opinion farmers generally, except those who have stuck to some staple crop that is already heavily overproduced, are going to have more cash in hand than they did last year. Some of any surplus existing after the crops have been sold will be invested in farm equipment, and this includes motor vehicles."

MEMPHIS, Tenn., July 14.—The automotive trade and bankers here are extremely hopeful that with the harvesting of the best crops in years in the Mississippi Valley business in the fall will show decided improvement. The basic cause for this optimism is the diversification of crops that has been practiced in this section during 1931. The Mississippi Delta country, traditionally the cotton-raising territory, has been planted to other crops to a far greater extent than ever before. Hay, oats and other grains, potatoes and other vegetables, are growing today on land that has never had anything but cotton on it.

Reports received from Arkansas,

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PLYMOUTH STEPS UP OUTPUT TO FULL PLANT CAPACITY

Ocean City, Md., July 14.—In an address before the Maryland State Automobile Dealers Association here yesterday, Harry G. Moock, general sales manager of Plymouth Motor Corporation, said:—

"Plymouth production for July was originally set at 7,500 automobiles, that was four weeks ago. By June 15 we found it necessary to increase this figure to 15,000.

"Last Saturday when I left Detroit, the order was given to our production officials to build as many Plymouths as the assembly lines could turn out. That's a sign of return prosperity if there ever was one."

AUTOMOBILE MAKERS FACE BRIGHT FUTURE, SAYS CHAS. M. SCHWAB

Indianapolis, Ind., July 14. — "When the people regain confidence business will again become active and with business activity there is sure to be prosperity," said Charles M. Schwab, famous Bethlehem Steel magnate who was a visitor at the Stutz Motor Car Company here last week.

In connection with his trip to Indianapolis it became known that the steel man, who formerly was prominently identified as controlling stockholder of Stutz, was again heavily interested in the company.

"I have long been interested in Stutz, and am more heavily interested now than ever owing to recent acquisitions," he said. "I guess I am now the largest individual holder of Stutz stock. My associates and I, acting in concert, control 70 per cent. of the stock. We are in it because we believe there are better times ahead and while I have no announcements to make for the

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TODAY

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STOCKS OF U. S. CARS IN FOREIGN MARKETS NOW BELOW NORMAL

Washington, July 14. — Present stocks of American cars in foreign countries are either normal or low in approximately 80 per cent. of this territory, according to figures issued by the automotive division of the Department of Commerce, based on cable reports received from thirty-eight countries.

The summation states that stocks of low priced cars are low in eleven countries, normal in eighteen and high in nine. The medium priced group shows low stocks in sixteen countries, normal in fifteen and high in seven. Stocks of high priced cars low in thirteen countries, normal in eleven and high in nine.

In some countries neither American nor European high priced automobiles are stocked. Stocks of European vehicles are principally in the low to normal categories. Of thirty countries, from which reports of European stocks were received, 13, 13 and 8 were in the normal stock columns for low, medium and high-priced cars in the order given.

Stocks of American heavy trucks were reported low in 13 countries, normal in 13 and high in 6.

American used car stocks were reported high in 13 countries, normal in 12 and low in 10. European used car stocks were reported high in seventeen countries out of thirty for which cables were received.

Quaker State Oil Mergers 19 Independent Firms

OIL CITY, Pa., July 14.—Announcement has been made of a merger of Pennsylvania oil refining and marketing companies. The Quaker State Oil Refining Corporation has been organized to acquire through merger nineteen companies engaged in the oil business in the Pennsylvania grade crude oil field.

Among the companies to be acquired are the Quaker State Oil Refining Company of Oil City, Pa.; Emlenton Refining Company of Emlenton, Pa.; Ohio Valley Refining Company of St. Mary's, W. Va.; Independent Refining Company of Oil City, Pa.;McKean County Refining Company of Bradford, Pa.; James B. Berry Sons Company of Oil City, Pa.; Chicago, Ill.; New York city, London, England, and Hamburg, Germany; Enterprise Oil Company of Buffalo, N. Y., and Sterling Oil Company of Emlenton, Pa.

The purpose of this merger is to place under one management refineries and marketing companies which have been for past year producing various refined oil products, with particular reference to Quaker State Motor Oil, which motor oils are marketed in the United States and Canada through more than 75,000 retail outlets and throughout all parts of the world. The Quaker State Oil Refining Company is the largest company producing and marketing Pennsylvania motor oil.

The new consolidated company will have as its capital structure one class of stock totaling about 900,000 shares of no par value. The present owners of the stock of the participating companies will exchange their stock for shares of the

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Circular Brings 20% Response, Sells 24 New Cars

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Mid-West Crops Promise To Help Fall Car Sales

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last year burned up by the worst drought in history, are to the effect that farmers have planted well diversified crops and will be self-supporting this year. Sections of Mississippi and Tennessee also suffered severely in last year's drought, and they too will be back on their feet this fall. Corn, beans and mixed vegetable crops are flourishing here, with every prospect that the farmers will be in fairly good shape in the fall.

Farm labor in this section is at the lowest point in many years, with a plentiful supply on hand. The farmers also have enjoyed lowered prices on most of the necessities that go into the production of crops, including household and family expenses.

Automotive operators in this section of the South are hopeful that the farming sections will have a fair amount of cash in hand after the crops have been sold and that a reasonable proportion of this will go into the purchase of motor equipment. There is a feeling of quiet confidence in the attitude toward fall business.

WASHINGTON, D. C., July 14.—The Department of Agriculture announced today that instead of the usual seasonal increase in farm wages, these have dropped during the past three months, and on July 1 were at the lowest point in fifteen years. On that date the index was only 125 per cent. of the pre-war level, as compared with 127 last spring and 160 at this time last year. On July 1 the average monthly wage with board for farmhands was $25.33, as compared with $33.47 a year ago.

New Australian Tariff To Aid Canadian Makers

(Continued from Page 1)

business lost by them some years ago.

At one time, branch automobile plants in Australia were supplied to a considerable extent with parts and material from Canada, but when the Australian tariff veered in favor of the United States, American sources did the supplying and none went to the Antipodes from Canada.

It will take some days to work out the exact effect of the new trade provisions. The general report that Australia had given more favorable ratings to products of Canadian motor plants is encouraging and might turn out to mean a revival of Canada's Australian trade in these products, according to H. A. Brown, vice-president and general manager of General Motors of Canada, Ltd., at Oshawa.

QUAKER STATE OIL MERGERS 19 FIRMS IN PENNSYLVANIA

(Continued from Page 1)

parent company. It is not contemplated that the corporation will do any new financing at this time.

The new company has established its headquarters at Oil City, Pa., and its officers are: President H. J. Crawford, Emlenton, Pa.; vice-presidents, Samuel Messer and James D. Berry, Oil City, Pa.; secretary and assistant treasurer, W. R. Reitz, Oil City, Pa.; treasurer and assistant secretary, Charles D. Berry, Oil City, Pa.

The directors are: Samuel Messer, James D. Berry, Charles D. Berry, W. R. Reitz, H. H. Lowrie and E. B. Theobald of Oil City, Pa.; H. J. Crawford, J. B. Hunter of Emlenton, Pa.; J. P. Flynn, Sistersville, W. Va.; P. J. Bayer, Erie, Pa., and T. B. Gregory, Pittsburgh, Pa.

The companies involved have long had a community of interest by means of interlocking ownership and directorate. The officers and directors have spent most of their business lives in the Pennsylvania grade crude oil field, and for the most part have been closely allied with one another.

TIMKEN BEARING TO CLOSE JULY 16 TO 29

Canton, O., July 14.—In accordance with the regular annual practice, the Timken Roller Bearing Company plants will be shut down from July 16 to July 29 for the regular summer vacation.

BOSTON

FOR modern travelers by air, rail or highway, here's a cordial welcome and complete hotel service. Wide variety of restaurants. Room with bath—single $3-$5. Double $4-$8. Garage service.

HOTEL LENOX
HOTEL BRUNSWICK
Boylston St. on either side of Copley Sq.
HOTEL BRADFORD
Tremont St. near Boston Common
L. C. PRIOR MANAGEMENT

AUTOMOBILE MAKERS FACE BRIGHT FUTURE, SAYS CHAS. M. SCHWAB

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company I foresee a great future in the field of automotive manufacture.

"The moratorium is a splendid gesture for the re-establishment of confidence and it meets my most hearty approval. Its effect on the business of the world and the nation may not be as direct as might be desired, but it will be very beneficial.

"Slight gains in the prices of stock and bonds inspire their owners and encourage them to buy and invest. President Hoover has sought to bring about a renewal of confidence in the future that will stimulate business, which means greater prosperity for all."

CHICAGO MOTOR CLUB PROTESTS JUSTICES SHARING IN FINES

Chicago, July 14.—Having lost its case in a lower court, the Chicago Motor Club through Charles M. Hayes, president, announced today that it will carry to the Supreme Court of Indiana its fight against the constitutionality of a law in that state which permits justices of the peace to share in costs collected from defendants who have been found guilty.

"The point of our argument is that the justice cannot be deemed impartial when, in order to collect costs in which he has a share, he must find the defendant guilty," declared Mr. Hayes in a statement. "When a defendant is declared innocent, no costs can be collected, of course, and the justice receives no fee. The fact that a justice must find against the defendant if he is to receive a fee disqualifies him, in our opinion, from giving the defendant a fair trial."

The case upon which the appeal is to be made is that in which Superior Judge Maurice Crites of East Chicago, Ind., rendered a decision denying a petition for a writ of habeas corpus in behalf of a motorist who had been fined $1 and assessed $13.70 in costs. The costs were distributed as follows: $5 to the justice, $5 to the prosecuting attorney and $3.70 to the constable.

HANCH PUTS NATION'S INSTALLMENT DEBT AT 2.8% OF INCOME

(Continued from Page 1)

The outstanding installment debt that year was $2,500,000,000 or 5 per cent. of this total of wages and salaries.

"Applying the installment debt to the total wages and salaries of the nation alone, which gives only 5 per cent., is an unfair method of calculating, however. Much of the installment debt is owed by other than wage earners, among whom are many thousands of small merchants and manufacturers and some of the six million farmers who are in business for themselves.

"The National Bureau of Economic Research places the total annual income of all people in the United States at $90,000,000,000 and two and one-half billion dollars is only 2.8 per cent. of this total. This probably is the fairest estimate of the extent which the American people have mortgaged their future to pay for installment goods.

"Our researches have proved beyond any possibility of controversy that people do not contract installment debts during a depression at any appreciable greater ratio than during prosperity. All past figures have proved that the ratio of installment debt to income tends to remain constant no matter what phase of the industrial cycle we are in, thus proving that there is no cause and effect relationship between the business depression and installment selling."

CHEVROLET OUTPUT IN JUNE ACCOUNTS FOR 33.8% OF ALL

New York, July 14.—Production of cars and trucks by the Chevrolet Motor Company in June accounted for 33.8 per cent. of the total output of the industry on the basis of the estimate of 250,000 made by Automotive Daily News. The Chevrolet output last month was 84,597, as previously announced in this paper.

In the first six months of this year, Chevrolet produced 32.1 per cent., or nearly one-third of all the motor vehicles made in the United States or Canada in that period. This compares with 25.2 per cent. of the total accounted for by the leading General Motors unit in the first half of 1930.

Chevrolet's output for the six months' period was 520,501, as against approximately 1,628,000 for the industry as a whole. Chevrolet's total was only 10 per cent. under that of the corresponding period of last year.

In June, 1930, Chevrolet produced 78,474 units, equivalent to 22.4 per cent. of the 349,596 cars and trucks turned out by the entire industry.

Chevrolet started strong this year and accounted for 39.7 per cent. of the total production in January. In February the company's share of the total dropped to 29.3 per cent., evening up somewhat. In March Chevrolet took 28.2 per cent. of the total and from then on the company's share has equaled at least 30 per cent. The April share was 30.2 per cent., while in May Chevrolet accounted for 33.5 per cent. of the output, slightly improving its position last month.

Here are the month by month production figures of the Chevrolet Company for this year and last, with the percentages of the total output of the industry indicated for each month:

	1931 Output	Per Cent of Total
January	69,035	39.7
February	67,318	29.3
March	79,603	28.2
April	106,096	30.2
May	113,852	33.5
June	84,597	33.8
Totals	520,501	32.1
	1930	
January	80,950	28.6
February	93,500	23.7
March	100,500	24.0
April	112,500	24.0
May	113,187	25.5
June	78,472	22.4
Totals	579,109	25.2

SPARKS *from* DETROIT

Roof Garden Cafeteria

* * *

Chittenden's Retirement

* * *

"Old Scout's" Dilemma

Chris Sinsabaugh—Detroit Editor

FEEDING 'em properly is a problem at any factory, but the United States Rubber Company here in Detroit has come across with something new that's the talk of the town in these hot days. Credit for the idea is given to M. A. Clark, manager of industrial relations of the company's tire department, who discovered that the roof of the plant, ten stories up and overlooking the river, would be an ideal place for an outdoor cafeteria for the employees.

No sooner said than done, and now the roof garden cafeteria daily feeds some 300 United States employees with a lunch in which strawberry shortcake and ice cream figure prominently on the menu. There's a radio too, while the tables are set beneath spacious awnings and gayly colored parasols. And if they feel like it and have enough time after finishing eating, dancing is in order.

For the busy workers in the plant whose lunch time is cut down because of rush of work, the commissary has put into service traveling cafeterias for each department. These are almost actual kitchens in themselves, with a compartment heated by electricity for keeping coffee and warm dishes warm, and ice cooling drinks and fruits. Box lunches are arranged as well as plate lunches, giving the workers two sandwiches, a piece of pie, fruit—all for 20 cents. A bottle of milk costs 6 cents.

The main dining room for the office workers and company executives is located in the company's clubhouse, a spacious, well-furnished building on the river front.

* * *

WHILE we are on the subject of eating, the conductor feels he must record the retirement of Bill Chittenden as manager director of the Detroit-Leland Hotel, for Bill really has been a part of the industry since the old days at the Pontchartrain, when that famous hostelry was the clubhouse of every one connected with the manufacture of automobiles. Chittenden was manager then. Just mentioning the old Ponchartrain bar recalls to old timers the many conferences that were held there, which often resulted in the formation of companies that figured prominently in the industry. But those days are gone. The Pontchartrain has been torn down and a bank now occupies the site.

When the Book-Cadillac opened, Chittenden served as assistant to Roy Carruthers, managing director, and when the Detroit-Leland opened several years ago, Bill took over its management. Chittenden is now on a long vacation up in Massachusetts.

This is the first time in more that seventy-five years, they tell me, that the name and personality of a Chittenden is not associated with a Detroit hotel, for Bill's father was one of the best known hotel men in the country, running the old Russell House, which was afterwards succeeded on the same site by the Pontchartrain.

* * *

"OLD SCOUT," the curved dash Oldsmobile which Dwight Huss is driving across the continent, carries a Michigan license tag, but it was not so easy to secure. When application was made for the necessary credentials the secretary of state asked for the factory serial number of the car. There was none. Inquiry as to the type of body brought out that it could not be identified by any particular name. Secretary Fitzgerald held that because of the missing data he could not issue the license.

However, when he was told it was a 1904 Oldsmobile and was about to rerun the famous race of twenty-six years ago, he cut the red tape and issued the credentials.

"Old Scout" was in the same dilemma some of us old boys were in during the war when we had to prove to the draft board that we had been born. We couldn't prove it. In my case I found that births weren't recorded in Pennsylvania when I came along. I was sent to the burgomaster of Athens to establish the fact that I was a citizen of the United States.

* * *

COMMERCIAL sound movies for public entertainment are now regarded as a necessity in the launching of new automobile models. We have had many of them, the latest being Plymouth's "The Fourth Milestone." Studebaker claims to have been the first manufacturer to use this method of reaching the public. It put out "Champions" and "A Race

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Hollywood De Vaux Dealer Uses Circular Successfully

Gets 20% Response and Sells 24 New Cars in First Six Weeks of Opening; Divides Salesmen In Zones

WITHIN six weeks after opening up of his new De Vaux dealership at 5760 Sunset Boulevard, Hollywood, Cal., Rex Anglin had sold twenty-four new De Vaux automobiles, an average of four automobiles a week, a mighty good showing for a new dealer with a new line.

How did Mr. Anglin do it?

He was materially aided by a mimeograph circular which has been circularized to 3,000 names of owners in the De Vaux price class, including Chevrolet, Ford, Pontiac and Essex.

"This circular brought remarkable response," declared Mr. Anglin. "Already we have had a 20 per cent. response, and we expect ultimately that the response will be 40 per cent., for that first circularization of the owners is still pulling.

"We have had inquiries by mail, telephone and in person from those receiving the circular. From 50 to 100 persons a day visit the salesroom, making it necessary to keep two salesmen on the sales floor and one in the service department."

The mimeograph circular in question, size about 8½ by 13 inches, is profusely illustrated with drawings showing the Anglin dealership, together with a legend showing the streets it faces on. The telephone number is conspicuously noted. Underneath this picture is a message signed by Anglin and addressed to "Friends." Beneath this appears a dashing sketch of the De Vaux and brief description, together with enumeration of a few features of the Hall motor.

"Don't fail — to see this new, years-ahead car at my show room," the circular admonishes readers.

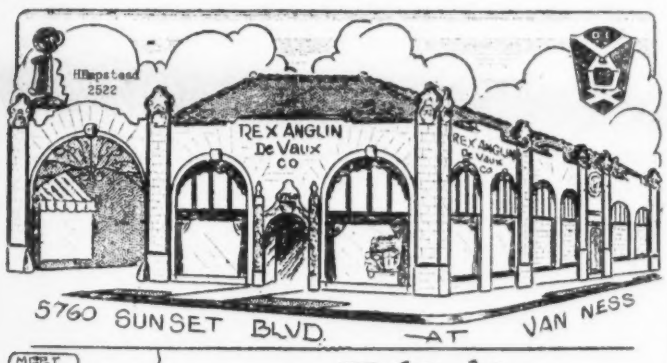
With eight new car salesmen on the staff, the territory has been divided into zones, according to Mr. Anglin, and each salesman is held responsible for that territory. He is expected to canvass it block by block. Each salesman is expected to make ten interviews a day and make three demonstrations.

In the case of prospects contacted during floor time that are not in the salesman's regular zoned territory, he may either exchange these prospects for prospects in his territory, or hold them for his own. If, however, he does not close them or make material progress within two or three days, he relinquishes such prospects outside his regular zone. However, there is no hard and fast rule in this regard, each circumstance being met as it arises.

Mr. Anglin finds that, at the present time, the best form of publicity he can get is to emphasize the car's speed and other road performances, and he has conducted several such grueling tests that have brought acclaim to the car, and, incidentally, to his dealership.

ERIC KULLBERGER ADDS CHRYSLER-PLYMOUTH LINE

Chicago, July 14.—Eric Kullberger has taken on the Chrysler-Plymouth line. Mr. Kullberger maintains a large sales and service building at 1447-53 East 75th St. He has been identified with the trade here for years.



Friends

I HOPE I NEED NO INTRODUCTION TO YOU

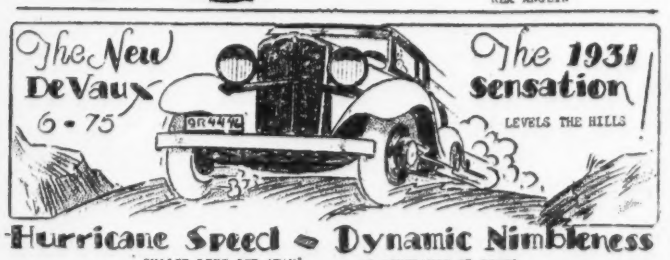
Most of you know of my long automobile experience and realize I should be a good judge of mechanical perfection in a car, and when I say the performance of the New DE VAUX is far superior to any small car I have ever driven, I am not exaggerating.

Point for point, this NEW 6-75 DE VAUX SIX, in beauty, power, speed, quick acceleration and every feature from headlights to tail light, is the greatest value ever offered the public. IT'S THE 1931 MARVEL OF MECHANICAL INGENUITY!

I want you to drive over to my new place and see first hand what the minds of these two great engineers have conceived, making it possible for all to own a car of such high class, at an unthought of low price.

Respectfully yours,

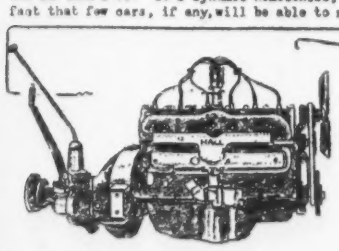
REX ANGLIN



Hurricane Speed - Dynamic Nimbleness

BULLET LIKE GET-AWAY! ..... AN ABUNDANCE OF POWER

You who are motor-wise, will be delighted with the dazzling performance of the new DE VAUX 6-75. It's dynamic nimbleness, and its eager responsiveness; fortell the fact that few cars, if any, will be able to match its all-around performance.



THINK OF A

70 HORSE POWER MOTOR, capable of propelling a car 80 miles per hour, great fuel economy, built by co-designers of the great Liberty Motor, and you may easily see why the new DE VAUX 6 - 75 surpasses all other low priced cars.

DON'T FAIL

TO SEE THIS NEW, YEARS-AHEAD CAR at my Show room.

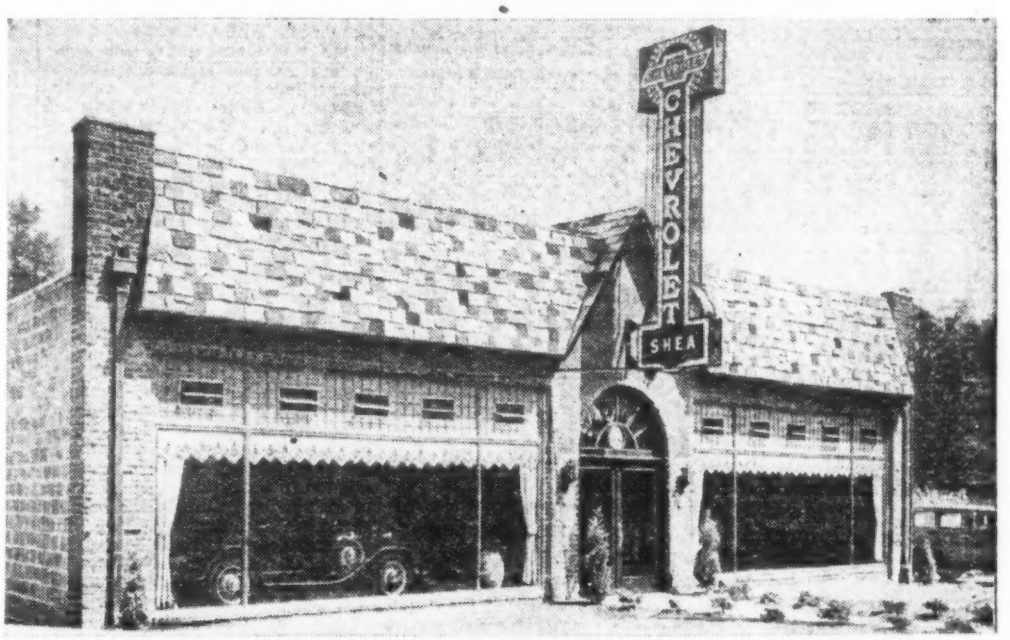
This Six-Cylinder HALL MOTOR was designed and perfected by Col. Elbert J. Hall, co-designer of the Liberty Motor.

SUNSET BLVD at VAN NESS - HOLLYWOOD

REX ANGLIN - DeVaux MOTOR CO.

ABOVE is a reproduction of the circular mailed by the new De Vaux dealer in Hollywood, Ca. The response, officials of the firm says, has been encouraging

Doubles June New, Used Car Sales by Taking New Location



INCREASING new and used car sales 10 per cent. over 1930, with June business double that of the corresponding month of last year, is credited by Walter Shea, president of the Shea Chevrolet Company of Teaneck, N. J., as due to the concern's moving to its new home.

The building, one of the most elaborate in the county, not only has an attractive front, but the attractiveness is carried out in the showroom and neat arrangement of parts department and offices. The service station is roomy and well lighted.

Discussing the service angle of the business, Mr. Shea finds that the service visualizing book has been a big boon, not only in increasing service work, but also in keeping customers satisfied.

"We find that satisfied customers are the best business builders. We do practically no car advertising, but, instead, we spend that money in seeing that the customer gets dollar for dollar by using the most completely equipped precision and time-saving tools that the Chevrolet Motor Company recommends."

Walter Shea has been with Chevrolet for eleven years, three years as Broadway and Bronx retail salesman in New York. For five years he was a Chevrolet dealer in Pittston, Pa., and the last three years dealer in Teaneck.

He believes in a constant campaign to bring Ford and Chevrolet owners into the showrooms and uses the telephone and mail consistently.

His used car sales have increased constantly through his merchandising of this product in open air showrooms.

Mr. Shea three years ago pioneered the used car lot in his territory and today operates two lots, one next door to the new car showrooms and another a mile away.

The oragnization consists of a sales manager, four new car salesmen, two used car salesmen, service manager, four mechanics and a helper.

In 1928, when Shea opened his showroom in Teaneck, he contracted for seventy-five new cars and sold 200. He has been averaging 200 new car sales each year since.

An indication of how well the concern has fared in its new location is seen by the June record. The close of June marked the end of the first month in the new home. New car sales totaled twenty-two, as compared with eleven in June, 1930, while used car sales were fifty, compared with twenty-five in the corresponding month last year. The firm's used car stock is the lowest since a year ago.

The best used car business, Mr. Shea says, is done with cars selling from $300 up. This is due to the locality, which gives the dealer the highest type of clientele.

In discussing the visualizing service book, Mr. Shea says that the service manager each day phones customers who have not been in for a month. Where the customer has no phone, the service manager makes a personal call. This system has brought in more business than anything else that has been tried.

The new showroom is 60x40 and accommodates six cars, giving plenty of room for the imported Italian furniture. The electric light fixtures were also imported from Italy. The inside walls are finished in imitation cave stone. The exterior is Old English, while the front lawn and broken blue stone walk give the place a unique appearance.

OLDS PRIZE WINNING RETAIL SALESMEN FETED

Lansing, Mich., July 14.—Prize-winning Oldsmobile retail salesmen from throughout the Cleveland zone were guests of the Olds Motor Works here at a banquet and conference in the Hotel Olds. Approximately seventy salesmen and dealers attended the gathering, with the salesmen representing the stellar group which garnered highest results in the Cleveland zone May and June sales contest.

The Oldsmobile representatives attending the session were headed by F. A. Ackerman, zone manager at Cleveland.

HUDSON-ESSEX SALES GAINING IN CHICAGO

Chicago, July 14.—W. E. Butler, president of Butler Motors, Hudson-Essex distributor, reported today that retail sales in the Chicago district for the week ended July 3 increased 136 per cent. over the preceding week and represented the largest business for any similar period since April.

LARRY BUTTLER ADDS FRANKLIN IN PATERSON

Paterson, N. J., July 14.—Larry Buttler, Inc., Graham dealer here, has been appointed Franklin distributor for Paterson, Ridgewood, and surrounding territory. He will retain the Graham dealership. His headquarters at 1000 Market St. is equipped to service both Franklin and Graham cars.

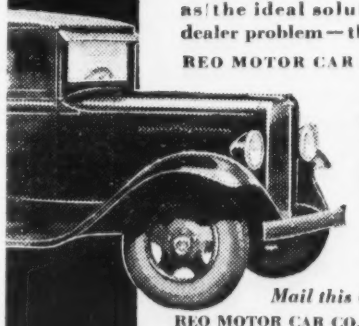
REO Offers Special new Truck Franchise

(With Regular Dealer Discounts)

Anyone thinking of a supplementary line will do well to inquire immediately about this latest important development in the Reo program.

Those who have heard the details regard it as the ideal solution of today's greatest dealer problem — the problem of profits.

REO MOTOR CAR CO., LANSING — TORONTO



$625

Four-cylinder $625, Six-cylinder $725
Chassis f. o. b. Lansing, Michigan
DUAL WHEELS EXTRA

Mail this Coupon At Once

REO MOTOR CAR CO., Lansing, Michigan ADN715

Please send me at once — either by letter or through your representative — details of the Reo Special Truck Franchise.

Name _____

Address _____ (City) _____ (State)

Automotive Daily News

"Of, By and For the Entire Automotive Industry"

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AUTOMOTIVE DAILY NEWS PUBLISHING CORPORATION,
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WEDNESDAY, JULY 15, 1931

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A Basis of Facts

IF there is one thing that the present depression has brought out it is the obvious slenderness of our understanding of the causes and cures of such economic phenomena. We have been informed by one expert that the depresrion has been caused by such a matter. Another more or less expert has insisted that something else has been the basic trouble. We have had as many different causes as there are different experts or would-be experts. And the net result has been the formation of a pretty definite opinion that no one knows much about the fundamental laws that govern, if they do, economic changes.

In a recent interview, Richard Whitney, president of the New York Stock Exchange, remarked, "On the whole, consumption rather than production seems to constitute the greatest threat against stability of business." Mr. Whitney suggests that great progress has been made toward scientific control of production, but that "by comparison, consumption statistics are scanty, incomplete and problematical as to their true signficance."

Then Mr. Whitney winds up: "The trends of consumption are themselves largely unpredictable and consequently subject to the changing whims of fashion. If any fundamental progress in stabilizing the fluctuations of business is actually to be realized, a more complete and accurate knowledge of consumption seems indispensable."

This is an extremely acute observation. At the present juncture of our national business affairs we know that the savings banks are bulging with money, but even slaughtered prices have not been a sufficiently strong magnet to bring out the hoarded wealth. Obviously money deposited in savings banks is not out of circulation. It goes into bonds and securities that help finance building and other programs, but in normal times this money would circulate in other channels, which apparently contribute more quickly and more effectively to inducing general prosperity.

In spite of all that has been written and said on the subject, our understanding of the fundamentals of economic ebb and flow are extremely meager. Consequently our ability to apply cures to economic maladies is very limited.

We are reminded of a meeting that we once had with a prospective dealer for a moderate priced car in a Pennsylvania city. This man was introduced to us by a zone man as "our new dealer in Blankville."

The "new dealer" shook hands and proceeded to amend the zone optimist's designation: "I am figuring on taking the Blatz on," he said, somewhat sheepishly, "but I'm having an analysis of the territory made first."

"Oh, sure," interrupted the zone man, "but that will be all right."

"What is your analysis going to cover?" we asked.

"Oh, just about everything," the prospective dealer replied. "I'm having our population analyzed by income and automobile registration. I want to know just how much service work I can count on getting and what used car practice is in Blankville. Some of the dealers there seem to me to be pretty wild traders and they might likely put me in a bad hole if they go too far."

We shook hands again with this prospective dealer. "In other words," we queried, "you are going to have a complete picture of the potentials of your territory before you take on the line?"

"Exactly," he answered. "I'm going to know just what I can expect, before I jump in."

"Oh," said the zone man, "that will be all right. You're going to be our dealer in Blankville, all right."

He was, but only after he knew everything about his territory and KNEW, not guessed, that he could show a reasonable return on his time and money. If every prospective retailer showed the same desire to know something about consumption before he began business we would have fewer failures to grace our vital statistics.

MASS. SEEKS TO CUT HIGH AUTOMOBILE INSURANCE RATES

Boston, Mass., July 14.—Following a meeting for the purpose of organizing to reduce the high automobile liability insurance rates in Massachusetts and especially with the purpose of combating the fraudulent and excessive claims which are made under the compulsory automobile liability law, at which representatives of various civic and State organizations as well as numerous casualty insurance men and a representative of the commissioner of insurance were present, an organization was effected with Frederick W. Mansfield, president of the Massachusetts Bar Association, as chairman and Third Deputy Insurance Commissioner Edgar P. Dougherty as secretary.

A statement was given out today by Chairman Mansfield covering the purpose and scope of the organization which relates the suggestions made for overcoming these fraudulent claims by former Commissioner of Insurance Monk, Governors Allen and Ely, as well as the appointment of a special commission to study the whole question of compulsory automobile liability insurance and their findings. The statement then goes on to say:

"Under these circumstances, in the interest of the public, the general taxpayer, the automobile owner and the more satisfactory operation of the Massachusetts law in regard to automobile insurance, a committee has been formed with approval of Gov. Ely and heads of various state departments, of representatives from various civic organizations and of insurance companies, both stock and mutual, whose business is directly controlled through the State Insurance Department, and whose rates are fixed by the insurance commissioner, to conduct a state-wide inquiry into the alleged abuses of the presentations and settlement of automobile claims.

"This inquiry is to be directed to the activities of lawyers, doctors and insurance employees themselves. The committee organized yesterday and selected Frederick W. Mansfield, president of the Massachusetts Bar Association, as chairman and Edgar P. Dougherty, third deputy commissioner of the Massachusetts Insurance Department, as secretary. Counsel are to be retained, and it is proposed to explain the situation to the justices of the Supreme Judicial Court and to ask the co-operation of the court and to seek authority as may be needed in the conduct of the investigation so far as it may be necessary in bringing particular cases before the court for inquiry.

"Insurance companies in Massachusetts, both stock and mutual, have contributed a preliminary fund for the purpose of this inquiry, to which it is hoped and expected will be added contributions from other civic bodies and private citizens.

"The committee also invites communications from any persons having information to impart which will be helpful to the committee."

COMING EVENTS

JULY

19—**Nurburg-Ring, Rhineland, Germany.** Automobile Club of Germany, grand prize race

SEPTEMBER

1- 3—**Cleveland, O.** Hotel Statler, Society of Automotive Engineers, twentieth annual aeronautical meeting in conjunction with National Air races.
8-17—**Utrecht, Holland.** Utrecht Fair, bus and truck show.
16-17—**Atlantic City, N. J.** National Petroleum Association, annual meeting, Hotel Traymore.
20-26—**Springfield, Mass.** Eastern States Exposition.
21-25—**Boston, Mass.** American Welding Society, meeting.
28-29—**Atlantic City, N. J.** National Association of Motor Bus Operators, fifth annual meeting, Hotel Ambassador.
26-Oct. 2—**Atlantic City, N. J.** American Electric Railway Association, annual meeting.

OCTOBER

1-11—**Paris, France.** International Automobile Salon.
2- 3—**Houston, Tex.** American Institute of Mining and Metallurgical Engineers, petroleum division meeting
12-16—**Chicago, Ill.** National Safety Council.
14-16—**Pittsburgh, Pa.** Society of Industrial Engineers, convention.
15-24—**London, England.** International Motor Exhibition, Olympia Hall.
22-28—**Prague, Czecho-Slovakia.** International Automobile Exposition.

Contemporary Comment

THE Chevrolet engineering department has become foundry-minded and designs no castings, even for experimental purposes, without taking the foundry into its confidence. On the basis of 1,000,000 cars per year we have to produce 245,000 tons of good castings. That means that we have to buy 245,000 tons of iron and scrap steel. If by one means or another we can save 10 cents per ton on the price, the freight, the handling, or on all three, we have saved $24,500. We use about 100,000 tons of coke and 122,000 tons of core sand. Even 1 cent a ton saved on these two items amounts to $2,200 a year. In the operating end we find the same results. Ten cents a ton saved on labor amounts to $24,500. Lowering the cost of a cylinder block 10 cents amounts to $100,000. When we reduce our scrap losses 1 per cent. in the foundry, we save approximately $175,000 a year. Reducing our core scrap 1 per cent. means a saving of $37,000.

One of the leading automobile casting foundries of 1916 produced 150 pounds of good castings per employee. Efficiency changed little during the next three years. When the foundry was built in Saginaw in 1919, I set 200 pounds per employee as the goal. This goal was not reached until 1922 and 1923. In 1924 we were able to raise this to 245 pounds. With the introduction of conveyor equipment we increased this to 345 pounds in 1925 and 1926, 380 pounds in 1927, 425 pounds in 1928, 489 pounds in 1929, and 585 pounds in 1930, a gain of approximately 370 per cent. in ten years. At present, for peak production we require 5,128 men. To produce this same tonnage on a 1916 to 1920 basis would require a force of 19,000 men.—**Arnold Lenz in Foundry.**

* * *

A METHOD of heating high-temperature salt baths for the heat treatment of steels, which consists in continuously passing a low-voltage alternating electric current directly through the bath between an electrode immersed in the bath and the metal wall of the pot, recently has been developed by the Bellis Heat Treating Company, Branford, Conn. The pot, made of steel, chrome iron or other metal alloy, either wrought or cast, is encased in firebrick and this setting, in turn, is encased within a relatively thick-walled insulated structure.

The relatively low temperature of the pot walls results in a greatly prolonged life of such pots, while the original salt bath material may be continued in use almost indefinitely, it being necessary only to add small quantities of such material to the bath from time to time to compensate for that carried off in the form of a thin film by the metal being treated.—**Steel.**

* * *

SEVERAL important departures from previous Thornycroft practice are found in the company's recently introduced NC/6 engine. This engine supplies the power for the Thornycroft QC series of 12-ton rigid 6-wheel chassis, the largest of the range of vehicles produced by this company. Normally, the engine is assembled to form a single unit with the gear box, and, in order that it may be fitted without modification to forward or normal control chassis, all the auxiliaries (with the exception of the electric starting motor) are grouped on the near side. As a natural result, they are rather crowded, and the carburetor obscures the magneto, which is driven in tandem with the lighting generator. The carburetor, however, is high enough up to be accessible. Side valves are employed, and, in order to render the tappets accessible for adjustment, the camshaft is mounted much higher up than usual. It runs, in fact, in a tunnel alongside the cylinder block, and works the valves, not through the usual type of tappet, but through rockers embodying a simple means of altering the clearance between the rocker and the valve stem.

Another new departure, so far as Thornycroft engines are concerned, is the driving of the camshaft and other auxiliaries, including the cooling fan, by a triple roller chain contained in a separate timing case attached to the forward end of the crank chamber. Naturally enough, the fan is driven through a clutch that allows a certain amount of slip when accelerating or decelerating rapidly.

Cast in one piece, the water jackets have pressed into them centrifugally cast-iron liners which are not difficult to withdraw and replace by new ones when they have become worn. The bore and stroke dimensions are 4¾ inches and 6½ inches, respectively, giving an R. A. C. rated horse power of 54.1, although in actual fact the engine develops up to about 100 brake horse power.—**Motor Transport (England).**

* * *

AN illuminating study of the impact reactions produced on pavements by vehicle wheels recently has been reported. Studies of the forces produced on the pavements by the same wheel when equipped with dual high-pressure pneumatic, dual balloon, and single balloon tires of equal capacity and carrying the same load resulted in proving that there is no question as to the additional protection to the road which results from replacing high-pressure pneumatic tires with balloon tires. The balloon tire operates at a lower inflation pressure and has a greater section height than the high pres-

(Continued on Page 10)

Insuring Wholesalers' Profits With Trucks

This report on economical truck operation in the wholesale field was prepared by the General Motors Truck Company, Pontiac, Mich., and is appearing in serial form in Automotive Daily News. Copies of this report in pamphlet form are now available at all General Motors Truck Company dealer and distributorships.

TIME saved by eliminating delays and idle time can be turned into immediate profit for the wholesaler in a number of ways. For example, these advantages of the time savings discussed in the foregoing pages are obvious:

They provide extra truck time for handling important rush orders.

They lower repair expense when aimed at cutting time in the shop.

They reduce the need for costly overtime work during rush days or seasons.

They speed up deliveries and provide more prompt service.

But there are two even more important ways in which time savings can be used to increase profits:

1. By eliminating excess truck capacity.

2. By using excess truck time and capacity for expansion.

Using Time Savings to Cut Truck Expense

Many wholesalers, if they carefully analyze their truck opertion, will find that they have one or two trucks which are seldom worked to full capacity day in and day out. These may be "reserve trucks" kept on hand to meet emergencies. They may be trucks purchased during a peak period when extra delivery capacity was needed, but not used to full capacity throughout the year.

Time savings in the daily operation of trucks frequently will enable the wholesaler to eliminate these part-time trucks from his fleet—or even to eliminate one truck which formerly seemed to be working to capacity. The basic aim of time-saving is to enable each truck to accomplish more work. And when several trucks in a fleet are enabled to accomplish more work each day, the result is that one or more trucks will be partially or totally "worked out of a job."

How easy it is to accomplish this task of eliminating one truck—especially in a sizable fleet—is shown by the accompanying table. When five minutes are saved out of each hour of an eight-hour day, the total time available for additional work is forty minutes for each truck And it takes only a few trucks doing forty minutes of additional work each day to eliminate one truck which is used only for occasional deliveries. And, indeed, a saving of forty minutes for each truck in a twelve-truck fleet means a saving of eight hours—or a full day's work for one truck.

HOW TIME SAVINGS MULTIPLY

Time savings of five minutes out of each hour mount up as follows with an eight-hour working day and twenty-five day month:

No. of Trucks	Min. each Day	Hours each Month
1	40	16.40
2	80	33.20
3	120	50.00
4	160	66.40
5	200	83.20
6	240	100.00
7	280	116.40
8	320	133.20
9	360	150.00
10	400	166.40
11	440	183.20
12	480	200.00

While it is always a profitable move to reduce the total investment in trucks by eliminating excess equipment, potential profits from time savings are greatest when the wholesaler sets about systematically to use every hour of truck time and every pound of truck capacity to accomplish profit-producing work. How to organize truck operation for profitable expansion of the wholesaler's activity and for increased profit on each order and item handled will be the subject matter of the next section of this report.

(To Be Continued)

RESTRICTIVE TRUCK BILLS ARE SIGNED

Chicago, July 14.—Two motor truck bills, one cutting the length of truck-trailer combinations from sixty-five to thirty-five feet maximum, and the other compelling the use of pneumatic tires, have just been signed by Gov. L. L. Emmerson. Both of these bills will become laws on January 1, 1933. They were rushed through in the closing two days of the latest legislative session. Plans are already being discussed for testing their constitutionality in the course after they go into force.

AUTOMOTIVE DIVIDENDS $2,005,570 FOR JUNE

New York, July 14.—Dividends paid my manufacturers of automobiles and automobile accessories in June amounted to $2,005,570, according to the Standard Statistics Company of New York.

Total cash dividend payments made by domestic corporations in June were $412,327,778.

BUS LINE AUTHORIZED

Boston, Mass., July 14.—The State Department of Public Utilities has granted a temporary certificate for operation of a bus line in Shrewsbury to the receivers of the Worcester Consolidated Street Railway Company. The Shrewsbury selectmen, it was explained to the board, have granted a temporary certificate to the railway, which it has promised to make permanent, and the State Department will make its certificate permanent when that is done.

GETS OSWEGO FRANCHISE

Oswego, N. Y., July 14.—The Syracuse & Oswego Motor Lines, Inc., operator of the motor coach lines between this city and Syracuse, has been given a franchise by Oswego to operate a bus line in this city, replacing the Ontario Motor Bus Corporation, which has suspended. The firm will use a light type of bus.

NEW BUS TERMINAL

New Britain, Conn., July 14.—The Central Bus Terminal of the Short Line on Washington Street here was opened recently. Motor coaches of the Short Line and affiliated companies will make twenty-two departures daily from the terminal, it is announced.

CONN. TRACTION OBSERVES TENTH BUS ANNIVERSARY

New Haven, Conn., July 14.—This month marks the tenth anniversary of motor bus operation by the Connecticut Company, southern New England traction concern. The first two buses began operating on July 11, 1921, in Stamford. Today the company operates 205 motor coaches over 338 miles of route, with an average aggregate daily mileage of 215,367 miles. The service is co-ordinated with the company's street car lines which are being reduced rapidly. A number of petitions for abandonment of tracks with substitution of motor service were recently filed by the company and are now awaiting consideration.

WORCESTER TRAFFIC GROUP ENJOYS ANNUAL OUTING

Worcester, Mass., July 14.—More than 150 men prominent in Eastern transportation circles gathered at the annual outing of the Worcester Traffic Club at the Wachusett Country Club. A program of sports, featured by a golf tournament, offered the afternoon's entertainment. The golf tournament, in charge of George Hathorne and Joseph S. Sampson, furnished some good contests. Low gross of 80 was made by A. J. Kelley. Low net was made by John Levins with 65. Baoby went to O. P. Fagan with 167.

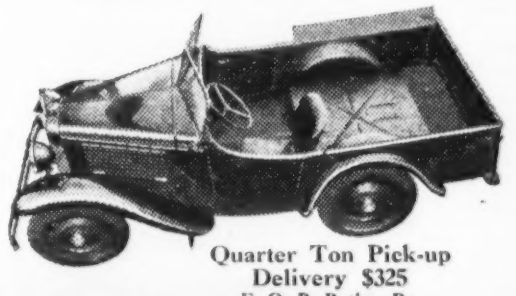
McMEANS APPOINTED BY GRAHAM-PAIGE

Detroit, July 14.—A. L. McMeans has been appointed San Francisco district manager for the Graham-Paige Motors Corporation, it is announced by C. W. Matheson, general sales manager.

Mr. McMeans was secretary of the original Dodge Brothers organization from 1902 to 1906. With Oakland from 1924 to 1927, he built up a strong dealer organization along the Pacific slope and later organized the De Soto dealer force in the same territory, having served with that company as district manager from 1928 until this year.

PUBLIC UTILITY OF N. J. ALLOWS FARE REVISION

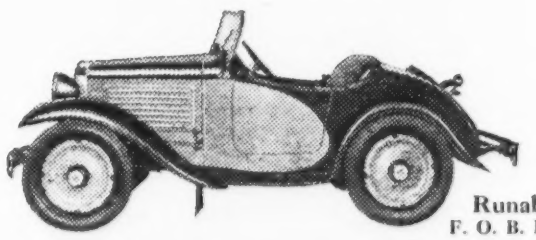
Trenton, N. J., July 14.—Revision of the fare schedule of the Inter-County Motor Corporation, which operates buses from Trenton to to Clinton and Flemington and on other routes in north Jersey, has been approved by the Board of Public Utility Commissioners. There will be a reduction of 15 per cent. in the cost of ten-trip tickets between the various points served by the company and lesser discounts on twenty, thirty and fifty trip tickets.



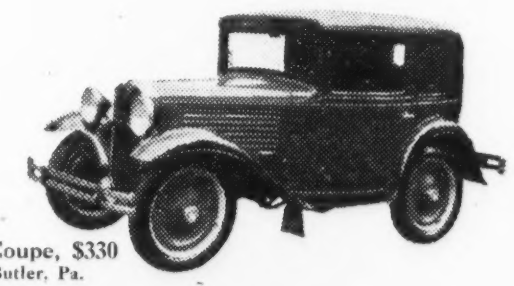
Quarter Ton Pick-up Delivery $325
F. O. B. Butler, Pa.

The Austins are a big family now!

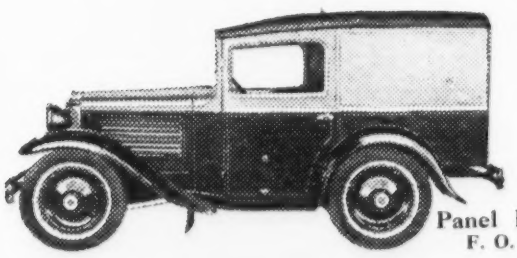
. . . and every member gives 10,000 miles for $75 worth of gas, oil and tires—a powerful selling argument



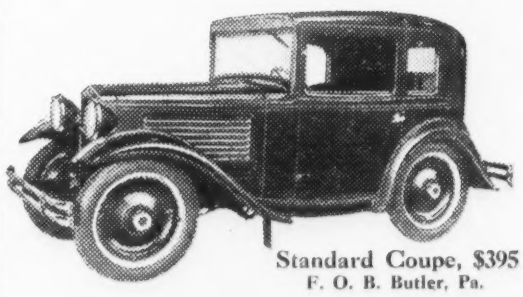
Runabout $395
F. O. B. Butler, Pa.



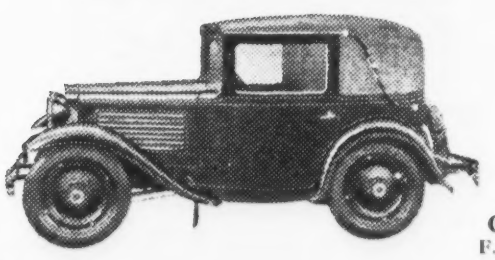
Business Coupe, $330
F. O. B. Butler, Pa.



Panel Delivery, $450
F. O. B. Butler, Pa.



Standard Coupe, $395
F. O. B. Butler, Pa.



Cabriolet $550
F. O. B. Butler, Pa.

THE AMERICAN Austin

THE AMERICAN AUSTIN CAR COMPANY, INC., BUTLER, PA.

ENGINES!
Bantam Engines are available for industrial use.
Write Department K.

DETROIT SERVICE CHIEFS PLAN PICNIC THURSDAY

Detroit, July 14.—The annual picnic of the D. A. D. Service Managers Association will be held next Thursday at the Maple Lane Golf and Country Club, Seventeen Mile Road and Van Dyke. President Elmer Reinhardt and the board of directors have arranged for a sufficient number of prizes for all the competition of the day. There will be the annual ball game in the morning between the service managers on the east side of Woodward, captained by Charles Fisher of the Graham Paige at Michigan, on the west side captained by Rex Kenerway of the Marmon Detroit Company. The annual "express wagon" polo game will be played between the east and west side service managers, with Norman Strachan of Cass Motor Sales captaining the east siders and Charlie Clements heading the west siders.

In the afternoon there will be en eighteen hole Kicker's Handicap for the golf players among the Service Managers Association, which will be in charge of W. J. Phillips of Miller-Judd Company.

MASTER REPAIR MEN'S GROUP DISCUSS ETHICS

Newark, N. J., July 14.—Members of the newly formed Master Automotive Repair Men's Association discussed their by-laws, a code of ethics and other points tending to produce higher standards of automobile repairs at a meeting in Newark.

The association now has about thirty-five members, with these officers: President, R. J. Niessner; vice-president, William Caldwell; secretary and treasurer, John Nuber; recording secretary, R. J. Bohaty.

Ideas were exchanged at the meeting and committees appointed.

HEIL CO. GETS U. S. ARMY TANK ORDER

Milwaukee, Wis., July 14.—The Heil Company, according to Julius Heil, president, has received an order from the United States army for special tanks to be placed on trucks used for refueling airplanes at federal airports throughout the country.

In all, 38 units will be equipped by the Milwaukee concern, the contract amounting to about $75,000. The trucks have been especially built to order. Last August the Heil Company equipped 30 trucks made by the Four Wheel Drive Auto Company, Clintonville.

FOKKER RESIGNS AS ENGINEERING DIRECTOR

Paterson, N. J., July 14. — Anthony H. G. Fokker, airplane designer, has resigned as director of engineering of the General Aviation Corporation and the Fokker Aircraft Corporation of America, both General Motors subsidiaries.

The resignation effected at a board meeting confirmed rumors current ever since the appointment of Herbert V. Thaden, of Pittsburgh as acting chief engineer and general manager of the Fokker concern. Fokker will remain as director and stockholder, however.

ATLAS-ANSONIA BUYS MOUNT CARMEL MFG. CO.

New Haven, Conn., July 14.—The Atlas-Ansonia Company, 54 Grant St., has purchased the plant and business of the Mount Carmel Manufacturing Company, Mount Carmel, and officials plan to resume full operations in the latter plant shortly. The Mount Carmel plant manufactures brass castings for automobile bodies, and normally employs from thirty to forty men.

HOLDS BRAKE CLINIC

Seattle, Wash., July 14.—F. B. Rowan, service manager of the Washington Nash Company, Nash distributor in this territory, was the principal speaker at the monthly meeting of the repair division of Automotive Maintenance Association. He explained the three types of brakes used on Nash cars. About 100 repairmen were present.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

Passenger Car Equipment and Accessories

NAME AND MODEL	Speedometer	Clock	Fuel Gauge on Dash	Lock	Spark Plugs	Battery	Heat Indicator	*Cig. Lighter	Smoking Set	Vanity Set	Make of Body Finish Used	Stop Light	Parking or Side Light	Safety Glass	Heater	Front Bumper	Rear Bumper	Wire Wheels	Shock Absorber
Auburn 8-98	Ste	—	K-S	Ele	Cha	USL	—	Cas	No	No	Mim	Ind	Ind	—	—	Cen	Cen	Day	Lov
Austin	NE	—	K-S	BS	Cha	USL	—	—	—	—	Duc	—	—	—	—	Cen	Cen	—	Own
Buick 8-50	AC	—	K-S	Her	AC	**	AC	—	Tern	—	Duc	Gui	Gui	—	—	Wol	Wol	K-H	Lov
Buick 8-60	AC	—	K-S	Her	AC	**	AC	—	Tern	—	Duc	Gui	Gui	—	—	Wol	Wol	K-H	Lov
Buick 8-80	AC	—	K-S	Her	AC	**	AC	—	Tern	—	Duc	Gui	Gui	—	—	Wol	Wol	K-H	Lov
Buick 8-90	AC	—	K-S	Her	AC	**	AC	—	Tern	Tern	Duc	Gui	Gui	—	—	Wol	Wol	K-H	Lov
Cadillac V-8	AC	Jag	Mot-M	DR	AC	DR	AC	Cas	Tern	Tern	Duc	Hal	Hal	Sec	Kel	Eat	Eat	K-H	Lov
Cadillac V-12	AC	Jag	Mot-M	DR	AC	Ex	AC	Cas	Tern	Tern	Duc	Hal	Hal	Sec	**	Eat	Eat	K-H	Lov
Cadillac V-16	AC	Jag	Mot-M	DR	AC	Ex	AC	Cas	Tern	Tern	Duc	Gui	Hal	Sec	*	Gen	Gen	K-H	Lov
Chevrolet	AC	—	AC	DR	AC	*	AC	—	Tern	—	Duc	Gui	Gui	—	*	†Own	Own	Own	Lov
Chrysler 6	NE	—	Mot-M	DR	AC	Wil	Yes	—	—	—	Ditz	Cor	Cor	Opt	—	—	—	—	Lov
Chrysler 8	NE	—	Mot-M	DR	AC	Wil	Mot-M	—	—	—	Ditz	Hal	Hal	Opt	—	—	—	—	Lov
Chrysler Imp. 8	AC	—	Mot-M	DR	AC	Wil	Mot-M	Cas	—	—	Ditz	Hal	Hal	Opt	—	—	—	—	Hou
Cord Front Drive	Ste	No	Mot-M	DR	Cha	USL	Ster	Cas	GR	No	Mur	Ind	Ind	—	No	ASP	ASP	Day	Hou
De Soto Six	NE	No	Mot-M	DR	AC	Wil	Yes	No	Yes	Yes	Duc	Cor	Hal	—	No	Yes	Yes	—	Lov
De Soto Eight	NE	No	Mot-M	DR	AC	Wil	Mot-M	No	Yes	Yes	Duc	Cor	Hal	—	No	Yes	Yes	—	Lov
De Vaux Six	Ste	No	Mot-M	Yale	Cha	Pre	Mot-M	No	No	No	Duc	JB	JB	—	No	Gen	Gen	MotoW	Hou
Dodge Six	NE	—	AC	DR	AC	Wil	AC	—	VS	VS	Ditz	Cor	Cor	Opt	—	Yes	Yes	Budd	Lov
Dodge Eight	NE	—	AC	DR	AC	Wil	AC	—	VS	VS	Ditz	Cor	Cor	Opt	—	Yes	Yes	Budd	Lov
Durant 610	NE	No	Mot-M	Aut-L	Cha	USL	Mot-M	NE	No	No	Rin	Cor	No	—	—	Bad	Bad	MotoW	Mon
Durant 612	NE	No	Mot-M	Aut-L	Cha	USL	Mot-M	NE	No	No	Rin	Cor	No	—	—	Eat	Eat	MotoW	Mon
Durant 614	NE	No	Mot-M	Aut-L	Cha	USL	Mot-M	NE	GR	No	Rin	Cor	Yes	—	—	Eat	Eat	MotoW	Mon
Durant 619	NE	No	Mot-M	Aut-L	Cha	USL	Mot-M	No	No	No	Rin	Cor	No	—	—	Bad	Bad	MotoW	Mon
Essex Super Six	Ste	—	Mot-M	Ele	AC	Ex	Mot-M	—	—	—	Ditz	JB	JB	—	—	Own	Own	†MotoW	Mon
Ford A	Var	—	Own	Ele	Cha	Own	—	—	—	—	—	Own	—	Tri	—	Own	Own	Own	Hou
Fr'klin S 15 Trans.	NE	Jag	K-S	DR	Cha	USL	—	Cas	*	GR	*	Cor	Cor	**	—	CG	CG	MotoW	Lov
Fr'klin S 15 De L.	NE	Wal	K-S	DR	Cha	Nat	—	Cas	*	GR	*	Cor	Cor	**	—	CG	CG	MotoW	Lov
Graham Bros. 6	NE	—	K-S	Her	Cha	Wil	Mot-M	—	—	—	*	Hal	Own	—	—	ASP	ASP	MotoW	Lov
Graham Stan. 6	NE	—	K-S	Her	Cha	Wil	Mot-M	—	GR	—	*	Hall	JB	LOF	—	ASP	ASP	MotoW	Lov
Graham Sp. 6	NE	—	K-S	Her	Cha	Wil	Mot-M	—	GR	—	*	Hall	JB	LOF	—	ASP	ASP	MotoW	Lov
Graham Sp. 8	NE	—	K-S	Her	Cha	Wil	Mot-M	—	GR	—	*	Hall	JB	LOF	—	ASP	ASP	MotoW	Lov
Graham Cust. 8	NE	*	K-S	Her	Cha	Wil	Mot-M	Cas	VS	—	*	Hall	JB	LOF	—	ASP	ASP	MotoW	Lov
Hudson Greater 8	Ste	—	Mot-M	Ele	AC	Ex	Mot-M	—	—	—	Ditz	Hal	Hal	Dup	—	Own	Own	†MotoW	Gab
Hupmobile Cen. 6	Ste	—	Mot-M	Ele	Cha	Wil	Mot-M	—	VS	—	Val	Cor	Cor	LOF	—	—	—	K-H	Gab
Hupmobile Cen. 8	Ste	—	Mot-M	Ele	Cha	Wil	Mot-M	—	VS	—	Val	Hal	Hal	LOF	—	—	—	K-H	Gab
Hupmobile U	Ste	—	Mot-M	Ele	Cha	Wil	Ster	Cas	VS	—	Val	Hal	Hal	LOF	—	—	—	K-H	Gab
Hupmobile H	Ste	—	Mot-M	Ele	Cha	Wil	Ster	Cas	VS	—	Val	Hal	Hal	LOF	—	—	—	K-H	Gab
Hupmobile C	Ste	—	Mot-M	Ele	Cha	Wil	Ster	—	VS	—	Val	Hal	Hal	LOF	—	—	—	K-H	Gab
La Salle V-8	AC	Jag	AC	DR	AC	DR	AC	Cas	Tern	Tern	Duc	Hal	Hal	Sec	—	Eat	Eat	K-H	Lov
Lincoln 8	NE	Thom	K-S	Her	Cha	Ex	Mot-M	Cas	Cuno	Yes	*	Hal	Own	Tri	—	Bif	Bif	Own	Hou
Marmon 70	Ste	No	Mot-M	DR	Cha	Nat	Mot-M	No	No	No	Val	Cor	Cor	Opt	No	Gen	Gen	Day	Gab
Marmon 88	NE	Ster	Mot-M	DR	Cha	Ex	Mot-M	Cas	Yes	Yes	Val	Cor	Cor	Dup	No	Gen	Gen	Day	Gab
Marmon 16	—	Ster	Mot-M	DR	Cha	Ex	Mot-M	Cas	Yes	Yes	Ditz	Hall	Hall	Dup	No	Gen	Gen	Day	Gab
Nash Nine 60	Ste	—	K-S	Her	AC	USL	K-S	—	Tern	—	*	**	**	Opt	—	Bad	Bad	†MotoW	Lov
Nash Nine 70	Ste	—	K-S	Her	AC	USL	K-S	—	VS	—	*	**	**	Opt	—	Bad	Bad	†MotoW	Lov
Nash Nine 80	Ste	—	K-S	Her	AC	USL	K-S	—	VS	—	*	**	**	Opt	—	Eat	Eat	†MotoW	Lov
Nash Nine 90	Ste	Borg	K-S	Blos	AC	Ex	K-S	Cas	VS	—	*	**	**	Opt	—	Eat	Eat	†MotoW	Lov
Oakland 8	AC	—	AC	BS	AC	DR	—	—	Tern	Tern	Duc	Gui	Gui	—	—	Own	Own	Moto-Wh	Lov
Oldsmobile	AC	—	AC	DR	AC	Wil	AC	—	Tern	—	Duc	Gui	—	—	—	—	—	MotoW	Lov
Packard 901	NE	Jag	K-S	—	Cha	Pre	Mot-M	Cas	—	—	Ditz	Hal	—	LOF	—	Cen	Cen	MotoW	Lov
Packard 902	NE	Jag	K-S	—	Cha	Pre	Mot-M	Cas	—	—	Ditz	Hal	—	LOF	—	Cen	Cen	MotoW	Lov
Packard 903	NE	Jag	K-S	—	Cha	Pre	Mot-M	Cas	—	—	Ditz	Hal	—	LOF	—	Cen	Cen	MotoW	Lov
Packard 904	NE	Jag	K-S	—	Cha	Pre	Mot-M	Cas	—	—	Ditz	Hal	—	LOF	—	Cen	Cen	MotoW	Lov
Peerless Stand. 8	AC	—	Mot-M	BS	Cha	Wil	Mot-M	Cas	—	No	Val	Cor	Cor	Dup	No	Cen	Cen	Bimel	Gab
Peerless Mast. 8	AC	Ster	Mot-M	BS	Cha	Wil	Mot-M	Cas	—	No	Val	Cor	Cor	Dup	—	Eat	Eat	Bimel	Gab
Peerless Cust. 8	AC	Ster	Mot-M	BS	Cha	Wil	Mot-M	Cas	GR	No	Val	Cor	Cor	Dup	—	Eat	Eat	Bimel	Gab
Pierce-Ar'w 41-2-3	NE	Wal	**	Her	Cha	Wil	**	NE	VS	VS	Mim	—	Gui	LOF	—	Eat	Eat	Budd	Lov
Plymouth	NE	—	Yes	Sha	AC	Wil	—	—	—	—	Duc	Cor	Cor	—	—	Gen	Gen	†	Lov
Pontiac	AC	—	AC	BS	AC	DR	—	—	Tern	Tern	Duc	Gui	Gui	—	—	Own	Own	K-H	Lov
Reo Royale 8-35	Ste	Elgin	K-S	DR	Cha	Wil	AC	Yes	Yes	No	†	Gui	Gui	†	No	CG	CG	MotoW	Lov
Reo Royale 8-31	Ste	No	K-S	DR	Cha	Wil	AC	Yes	Yes	No	†	Gui	Gui		No	CG	CG	MotoW	Lov
Reo 8-21	Ste	No	K-S	DR	Cha	Wil	K-S	No	No	No	—	*	*	No	No	CG	CG	—	Lov
Reo 6-21	Ste	No	K-S	DR	Cha	Wil	K-S	No	No	No	—	*	*	No	No	CG	CG	—	Lov
Reo Fly'g Cl'd 625	Ste	—	K-S	DR	Cha	Wil	AC	Yes	Yes	No	†	—	Gui	†	No	CG	CG	MotoW	Lov
Studebaker Six	Ste	No	K-S	Yale	Cha	Wil	Ste	—	No	No	*	Ind	Ind	—	No	Ste	Ste	K-H	Lov
Studebak'r Dict. 8	Ste	No	K-S	Yale	Cha	Wil	Ste	No	—	No	*	Ind	Gui	—	No	Ste	Ste	K-H	Lov
Stud. Com. 8-70	Ste	No	K-S	Her	Cha	Wil	Ste	—	—	No	*	Gui	Gui	†	No	Ste	Ste	K-H	Lov
Stud. Pres. 8-80	Ste	NH	K-S	Her	Cha	Wil	Ste	Cas	*	No	*	Gui	Gui	†	No	Ste	Ste	K-H	Hou
Stud. Pres. 8-90	Ste	NH	K-S	Her	Cha	Wil	Ste	Cas	*	No	*	Gui	Gui	†	No	Ste	Ste	K-H	Hou
Stutz LA	Ste	Wal	Mot-M	DR	Cha	Pre	Mot-M	Cas	No	Lin	Val	Ind	—	Dup	—	Buck	Buck	MotoW	Gab
Stutz MA	Ste	Wal	Mot-M	Her	Cha	Pre	Mot-M	Cas	Lin	Lin	Val	Ind	—	Dup	—	Stan	Stan	K-H	Gab
Stutz MB	Ste	Wal	Mot-M	Her	Cha	Pre	Mot-M	Cas	Lin	Lin	Val	Ind	—	Dup	—	Stan	Stan	K-H	Gab
Stutz DV 32	Ste	Wal	Mot-M	Her	Cha	Pre	Mot-M	Cas	Lin	Lin	Val	Ind	Ind	Dup	—	Stan	Stan	K-H	Gab
Willys 97-98 D	NE	No	K-S	Aut-L	Cha	USL	No	No	*	No	*	Yes	Yes	Opt	No	*	*	†	Mon
Willys 8-80 D	NE	No	K-S	Aut-L	Cha	USL	Yes	—	Yes	No	*	Yes	Yes	Opt	No	*	*	†	Mon
Willys-K. 66D	NE	No	K-S	Aut-L	Cha	USL	Yes	—	Yes	No	*	Yes	Yes	Opt	No	*	*	†	Mon
Willys-K. 95	NE	—	Yes	—	Cha	USL	Yes	—	—	—	Own	Yes	Yes	Opt	—	*	*	Yes	Mon

KEY TO ABBREVIATIONS USED IN THIS TABLE

SPEEDOMETER
AC—AC Spark Plug Co., Flint, Mich.
NE—North East Appliance Corp., Rochester, N. Y.
Ste—Stewart-Warner Speedometer Corp., Chicago.
Var—Various makes.

CLOCK
Borg—Borg Clock Co.
Elgin—Elgin Watch Co.
Jag—Jaeger Watch Co., New York city.
NH—New Haven. See Phi.
Phi—Phinney-Walker Co., New York city.
Ster—Sterling Clock Co., La Salle, Ill.
Thom—Seth Thomas Clock Co.
Wal—Waltham Watch Co., Waltham, Mass.
*Optional.

FUEL GAUGE
AC—AC Spark Plug Co., Flint, Mich.
K-S—King Seeley Corp., Ann Arbor, Mich.
Mot-M—Moto Meter Gauge and Equipment Corp., Long Island City, N. Y., and La Crosse, Wis.
**—Pierce-Arrow uses both U. S. and King Seeley.

LOCK
Aut-L—Electric Auto-Lite Co., Toledo.
BS—Briggs-Stratton Co., Milwaukee.
Blos—Blossom, Delco-Remy Corp., Anderson, Ind
Ele—Mitchell Specialty Co., Holmesburg, Pa.
DR—Delco-Remy Corp., Anderson, Ind.
Her—Hershey Mfg. Co., Chicago.
Sha—Shaler Lock Co., Milwaukee, Wis.
Yale—Yale & Towne Mfg. Co.

SPARK PLUG
AC—AC Spark Plug Co., Flint, Mich.
Cha—Champion Spark Plug Co., Toledo, O

BATTERY
DR—Delco Remy Corp.
Ex—Electric Storage Battery Co., Philadelphia.
Nat—National Lead Battery Co., St. Paul Minn.
Pre—Prest-O-Lite Co., Indianapolis, Ind.
USL—U S L Battery Corp., Niagara Falls, N. Y.
Wil—Willard Storage Battery Co., Cleveland, O.
*Various makes—Exide, Willard, Delco-Remy and USL.
**Both Exide and Delco-Remy used.

HEAT INDICATOR
AC—AC Spark Plug Co., Flint, Mich.
Mot-M—Moto Meter Gauge and Equipment Corp., Long Island City, N. Y., and La Crosse, Wis.
Ste—Stewart-Warner Speedometer Corp.
Ster—Sterling Clock Co., La Salle, Ill.
US—U. S. Gauge Co., N. Y. C.
**Using boh U. S and AC.

CIGAR LIGHTER
*Cigar lighters in many cases are optional equipment, and are not standard on all models; the names of lighters shown indicate the makes supplied to various car makers.
Cas—Casco Products Corp., Bridgeport, Conn.
NE—North East Appliance Corp., Rochester, N. Y.

SMOKING AND VANITY SETS
GR—Grand Rapids Metalcraft Corp., Grand Rapids, Mich.
Lin—Linden.
VS—Van Sickien Corp., Elgin, Ill.
Tern—Ternstedt Mfg. Co., Detroit, Mich.
Cuno—Cuno Engineering Corp., Meriden, Conn.
*Various makes.

BODY FINISH
Ditz—Ditzler Color Co., Detroit, Mich.
Duc—E. I. du Pont de Nemours & Co., Philadelphia.
MIM—Pittsburgh Plate Glass Co.
Mur—Murphy Varnish Co., Newark, N. J.
Rin—Rinched Mason Co.
Val—Valentine & Co., New York city.
*Various lacquers used.
†Using both Ditzler and Pratt & Lambert.

STOP AND PARKING LIGHTS
Cor—Corcoran Lamp Co.
Gui—Guide Lamp Corp., Anderson, Ind.
Hal—C. M. Hall Lamp Co., Detroit, Mich.
Ind—Indiana Lamp Corp., Connersville, Ind.
JB—The Jno. W. Brown Lamp Mfg. Co., Columbus, O.
*Using both Hall or Guide.
**Using both Corcoran and Brown.

SAFETY GLASS
Sec—Security, product of General Motors.
Tri—Triplex Safety Glass Co.
LOF—Libbey-Owens-Ford.
Dup—Duplate Corp.
Indestructo—Indestructo Glass Corp.
Opt—Optional.
**—Using both L-O-F and Indestructo.
*—Using both Security and Duplate.
†—Using both L-O-F and Duplate.

HEATER
Kel—Kelch made by Grand Rapids Metalcraft Corp., Grand Rapids, Mich.
*Optional.
**Not standard equipment on Cadillac V-12.

BUMPERS
ASP—Alloy Steel Products.
Bad—Badger Mfg. Corp., Milwaukee.
Bif—Bifler Corp., Waukegan, Ill.
Buck—See Cen.
CG—C. G. Spring and Bumper Company.
Cen—Central Brass & Fixture Co., Springfield, O. Also makers of Buckeye bumpers.
Eat—Eaton Axle and Spring Co., Cleveland, O.
Gen—General Spring and Bumper, Detroit.
Stan—Standard Steel Spring Corp.
Ste—Stewart-Warner Speedometer Corp.
Wol—Wolverine Bumper & Spec. Co.
†Extra equipment.
*Optional.

WIRE WHEELS
Bimel—Bimel Spoke and Auto Wheel Co., Portland, Ind.
Budd—Budd Wheel Co., Detroit.
MotoW—Motor Wheel Corp., Lansing, Mich.
Day—Dayton Wire Wheel Co., Dayton, O.
K-H—Kelsey-Hayes, Detroit, Mich.
†Using both Kelsey-Hayes and Motor Wheel Corp.
†Not standard equipment.

SHOCK ABSORBERS
Gab—The Gabriel Company, Cleveland.
Hou—Houde Engineering Corp., Buffalo, N. Y.
Lov—Delco Products Corp., Dayton, O.
Mon—Monroe Auto Equip. Mfg. Co., Monroe, Mich.

APRIL CANADIAN EXPORTS DROP; OUTPUT INCREASES

WASHINGTON, JULY 14.—The $498,061 worth of motor vehicles exported from Canada in April, 1931, represented a decrease of 37 per cent. from similar shipments in March, 1931, and of 63 per cent. from the $1,349,325 worth exported in April, 1930.

Shipments of passenger cars in the classification "valued up to $500" showed a decrease of 46 per cent.; units "valued over $500 to $1,000," 24 per cent., and those "valued over $1,000," 54 per cent. Shipments of trucks decreased to a less extent, those of one ton or less capacity declining 14 per cent., while heavier trucks, over one ton capacity, decreased 29 per cent. April, 1931, exports of motor vehicle parts were valued at $82,507, a loss of 25 per cent. as compared with March, 1931, but a gain of 57 per cent. over parts shipped in February, 1931.

April production totaled 17,159 vehicles, an average of 572 units a day, as compared with a daily output of 419 cars in March, 1931, and 809 cars in April, 1930. The output in April was 37 per cent. higher than in March, the greatest improvement of any month of the year to date. The increase occurred mostly in closed passenger cars, with smaller gains for all other models. Closed passenger cars advanced to 12,336 units from 9,319, open passenger cars to 1,655 from 1,002, and trucks to 3,116 from 2,510.

The Dominion Bureau of Statistics index number of motor car production, which started in January at 60 per cent. below normal, moved up twenty points during the first quarter of the year and again advanced fourteen points in April, to register 26 per cent. below normal.

The average value of passenger cars and trucks exported in April was $456 and $336, respectively, as compared with $447 and $389 in the preceding month.

British India took only four fewer truck units in April than in March, 1931, and advanced from second to first place as a purchaser. Shipments to British South Africa, which was the leading truck market in March, decreased 37 per cent., dropping that market to second position. In the exports to Straits Settlements, New Zealand, Jamaica and Newfoundland, increases were registered over both March, 1931, and April, 1930.

British South Africa, though 46 per cent. less than in March, 1931, still remained the best market for Canadian passenger cars. Of these shipments, 150 were in the classification "valued at less than $500." The Netherland East Indies, with a gain in purchases of 111 per cent., advanced from fifth position in March to second in April. The greater part of its takings (94 units) were valued at less than $500. Exports to British India, which held second position in March, 1931, dropped 73 per cent. in April.

The purchases of a number of countries (Netherland East Indies, Argentina, Straits Settlements, Jamaica, United States, Japan, Trinidad and Tobago, Sweden, Malta, and other British West Indies) showed small increases over April of a year ago.

Exports and Production of Canadian Passenger Cars and Trucks (Complete or Chassis) by Number

Item	April, '30	March, '31	April, '31
Exports—Passenger cars	2,303	1,327	763
Trucks	968	526	409
Total	3,271	1,853	1,172
Production—Passenger cars	20,872	10,483	14,043
Trucks	3,385	2,510	3,116
Total	24,257	12,993	17,159

Exports of Passenger Cars and Chassis, Motor Trucks, Buses and Chassis From Canada

Classification	April, '30 No.	—March, 1931— No.	Value	—April, 1930— No.	Value
Passenger Cars and Chassis:					
Class—Valued up to $500	1,784	1,060	$417,597	569	$227,212
Valued over $500 to $1,000	504	241	147,099	182	105,022
Valued over $1,000	15	26	29,675	12	15,787
Total	2,303	1,327	$594,371	763	$348,021
Destination (lead'g m'kets):					
British South Africa	228	362	$145,087	195	$85,716
Netherland East Indies	102	54	25,279	114	48,265
British India	429	311	132,556	83	32,173
Argentina	...	8	9,272	58	28,508
Straits Settlements	54	42	17,829	58	23,510
United Kingdom	147	118	71,180	49	29,771
Jamaica	5	34	15,053	41	19,294
New Zealand	548	84	32,178	28	11,323
United States	23	34	11,935	25	12,059
Japan	14	1	412	24	11,484
Trinidad and Tobago	7	33	17,455	15	6,276
Sweden	...	9	4,444	12	7,095
Malta	5	...	.....	12	5,838
Other British W. Indies	3	12	4,822	8	3,136
Motor Trucks, Buses and Chassis—Class:					
Capacity 1 ton or less	301	220	$76,784	193	$62,757
Capacity over 1 ton	667	306	128,043	216	87,283
Total	968	526	$204,827	409	$150,040
Destination (lead'g m'rkets):					
British India	222	100	$38,574	96	$36,059
British South Africa	270	120	48,469	75	27,757
British West Africa	86	58	20,469	58	19,108
Straits Settlements	4	8	2,280	38	11,695
New Zealand	8	...	.....	36	9,408
Netherland East Indies	4	40	17,181	32	13,197
Venezuela	58	12	4,689	18	7,034
Jamaica	—	12	5,634	15	8,758
Newfoundland	4	..	.....	11	5,283

GENERAL TIRE CO. DECLARES DIVIDEND

Akron, O., July 14.—When directors of the General Tire and Rubber Company yesterday declared the sixty-second consecutive dividend on the company's common stock, W. O'Neil, president of General, announced that the company had made and sold 18 per cent. more tires in the first six months of the present fiscal year than during the same period in 1930.

Company directors authorized payment of a dividend of 75 cents a share to common stockholders of record on July 21, payment to be made on August 1. This was the same amount as was paid to General common stockholders during the last previous quarter in April.

COMPULSORY TEST IN N. J. SET FOR SPRING BY HOFFMAN

Trenton, N. J., July 14.—Compulsory inspection of all the automobiles in the state, as required under an act passed by the Legislature, is not likely to take place until some time next spring. The act, sponsored by Senator Donald Sterner of Monmouth, provides that the governor must proclaim the date for the inspection.

Harold G. Hoffman, commissioner of motor vehicles, said that the testing campaign would probably not be held this year, as it was his hope to hold it at the same time as the examination in New York, which will be in the spring. Pennsylvania, which has similar legislation, also will probably hold its inspection at the same time, it is understood, so that a reciprocal agreement may be worked out among officials of the three states.

Two inspections already have been held by New Jersey, both under the supervision of Commisioner William L. Dill. Since neither was compulsory it was found that only about half of the drivers of the state submitted their cars for check-up.

Under the 1931 act number of inspections may be held during the year, depending on the governor's proclamation. Present plans, it is understood, call for only one annually, although if the results warrant another may be held in the fall.

The proclamation must state the time of inspection and also the time when repairs must be completed. Commissioner Hoffman is to designate official testing stations and a fee of 50 cents will be charged for each inspection. The act gives the commissioner power to revoke registration plates and also permits him to require a certificate of before new license plates can be issued. A penalty of $50 fine or ten days in jail is provided.

COAST TO COAST GARAGE SYSTEM IS ORGANIZED

Chicago, July 14.—Organization of Hart Garages, Inc., formed to own, operate and manage garages on a coast to coast scale, is just announced. Headquarters of the company have been established here in the La Salle Wacker building. At the election of officers just held, Harry B. Staver, pioneer vehicle manufacturer of Chicago, was chosen president; Kenthh Wilcox, secretary, and Frank J. Czech, treasurer.

Albert Hart, originator of the plan and the man for whow it is named, today made known its features, including interchangeable service, standardized methods and rates in all parts of the country and a special credit arrangement for the benefit of motorists patronizing any garage in the chain.

In addition to handling tires, batteries, gasoline, oil, greasing and other items, Hart Garages, Inc., has adopted a plan of introducing automobile radios under the Hart name, which will be merchandised through the garages in the system.

CONSIDER FURTHER STANDARDIZATION OF STEEL BARREL PLUGS

New York, July 14.—Information is being sought by the American Petroleum Institute's Division of Refining Committee on Standardization of Refinery Equipment as to whether users of steel barrels favor a higher degree of standardization of steel barrel plugs to promote interchangeability. Some additions and modifications of the specifications of the Steel Barrel Manufacturers' Institute have been suggested, and a statement covering the modification prepared.

Those interested have been asked to communicate with R. P. Anderson, secretary of the committee, at the American Petroleum Institute, 250 Park Ave., New York, N. Y.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

SPARKS from DETROIT

(Continued from Page 2)

to the Clouds," and its latest is "Wild Flowers." This last named picture has been shown in 500 theaters and the aggregate attendance has been 2,547,030.

In "Wild Flowers" the star is the world's largest automobile, built to commemorate the second anniverary of the 30,000-mile record drive of the President Eight. That giant car has fifteen and a half times the capacity of the normal automobile. There is room for twenty-two in the driver's seat and accommodations for eight or ten more elsewhere. It took sixty men three months to build it.

A. P. I. ADOPTS MARKETING CODE

New York, July 14.—The Federal Trade Commission has been notified by the American Petroleum Institute that the institute's board of directors, by resolution, has approved and accepted the twenty-one trade practice rules for the petroleum industry as embodied in the National Code of Practices for Marketing Refined Petroleum Products revised, reapproved and promulgated by the commission on June 12 last.

In a letter to Otis B. Johnson, secretary of the commission, W. R. Boyd, Jr., executive vice-president of the institute, presented a copy of the resolution and said he had been instructed by the board of directors to "signify to the commission our approval, adoption and acceptance of said rules as trade practice conference rules to be used by the petroleum industry with the commission's approval."

The resolution was adopted by a mail vote of the board well within the sixty days from June 12 granted by the commission for consideration and acceptance of the revised code, and represents approval by the petroleum industry of marketing rules already signed by more than 16,000 petroleum marketers.

The movement for a marketing code was initiated June 29, 1928, by the institute. On December 5 of that year the board of directors approved the text for recommendation to the Federal Trade Commission. The commission called an open trade practice conference for February 11, 1929, at St. Louis, Mo., at which the proposed code was discussed. On June 22, 1929, the commission approved and promulgated twenty-one trade practice rules contained in the the National Code of Practices for Marketing Refined Petroleum Products. These were approved by the institute's board of directors on July 30, 1929.

On January 30 of this year, however, the commission reconsidered and rescinded its action in approving the code, but upon application of the institute reinstated its approval pending a hearing. A committee representing the institute, selected during a national conference of petroleum marketers held at Chicago on March 4, 1931, later was received by the commission at Washington, D. C. The committee presented the plea of the industry for permanent reinstatement of approval of the rules and the commission, on June 21, took final action reapproving the rules with only minor changes.

30 CHEVROLET DEALERS HEAR J. D. McCLOUD

Lansing, Mich., July 14—More than thirty Chevrolet dealers from the Lansing area convened at the Hotel Olds here Monday night in a sales policy session under J. D. McCloud, sales chief for the Chevrolet Motor Car Company. Dealers from towns within a radius of twenty miles attended the gathering, according to Fred England, president of Standard Chevrolet Sales here.

THE PUBLIC DEMANDS THE COMMON SENSE PROTECTION OF SAFETY GLASS

•

Protection and safety are as much a part of automobile construction as the wheels themselves. Safety Glass is one of the most important—one of the most necessary features of protection and safety that can be built into an automobile. • Libbey-Owens-Ford Safety Glass is known and preferred by the automobile buying public.

LIBBEY-OWENS-FORD GLASS COMPANY, TOLEDO, OHIO

Manufacturers of Highest Quality Flat Drawn Window Glass, Polished Plate Glass and Shatterproof Safety Glass; also distributors of Figured and Wire Glass manufactured by the Blue Ridge Glass Corporation of Kingsport, Tenn.

The following are users of L-O-F Safety Glass: Packard, Graham, Studebaker, Franklin, Reo, Willys, Willys-Knight and Ford. It is also used in Dietrich and Le Baron Custom Bodies, Reo Speed Wagons, Twin Coaches, Brill Trolley Buses, Cincinnati Trackless Trolley Coaches, Bender Bus Bodies, Hackney and Springfield School and Passenger Bus Bodies, White School Buses, Stinson Aircraft, Gar Wood Boats and Matthews Cruisers.

Listen to Floyd Gibbons every Sunday evening at 10:15 Eastern Daylight Time, over WJZ and associated NBC stations.

LIBBEY-OWENS-FORD SAFETY GLASS

Production - - Engineering - - Factory -

Need for Co-operation Between Engineer and Foundry

The following is part of the first symposium on malleable iron castings planned by the American Foundrymen's Association and the American Society for Testing Materials. It was prepared by a committee of the two societies for the purpose of providing the engineering profession with authoritative data in concise form on the properties of metal castings produced by the best present methods.

Every effort should be made to stimulate co-operation between engineer-designer, manufacturer and foundry, for such co-operation will promote production of castings of the greatest soundness and other physical properties, at least cost. This will be evident from a consideration of the particular defects in casting design that not only cause trouble to the founder, but make for unreliability of product and lowering of production. Frequently the designing of castings without consideration of the foundry and metallurgical factors involved has led to high rejections and costs, where changes in design could have been made without affecting the utility of the part, which would have permitted lower cost of production and at the same time better physical properties.

The simplest form of casting, the ingot, has been given every attention by the producers of ingots for the promotion of soundness, with results that have justified the efforts. All other castings, which are in fact modified forms of ingots, present more complicated metallurgical problems in prevention of shrinkage cracks, blows and washes than do ingots.

Some outstanding factors which should be considered by the designer of castings are:

1. The stock of the casting should be as nearly uniform as possible, avoiding direct connection of heavy sections to light sections. Shrinkage cracks will develop at points of quick change of section. Where it is necessary to vary metal from light to heavy sections, a gradual taper of the joint should be developed.

2. When heavy sections or bosses are surrounded by light sections it is impossible to secure proper feeding of the boss, resulting in unsoundness. This trouble can be overcome by placing ribs of sufficient section on the light thin parts to permit feeding.

3. Cross sections such as ribs forming a cross should at all times be avoided.

4. The design should be made sufficiently heavy or thick to permit adding a gate of such size as to insure good feeding of all sections.

5. Use as large fillets as possible and avoid sharp corners.

6. Avoid dry sand cores wherever possible, especially where castings on cooling contract around a core.

7. Parting lines should be made as even as possible.

8. Designs should be such as to provide ample draft for easy molding.

There are other considerations which will apply in many cases, and it is a good rule to consult the foundry which is to produce the casting while the design is in the preliminary stage.

Some of the more important factors just mentioned will be briefly discussed.

Gating—The gating and heading of castings is an art in which one can be proficient only after years of diversified experience, and while the designer is able to estimate correctly the sectional areas necessary to withstand safely the stresses to which the casting will be subjected in service, the problem as it affects both his company and the founder is beyond the mere calculation of stresses and strains and the choice of a proper safety factor.

Provision for Adequate Thickness—For the sake of illustration, assume that a few thin, circular-disc shaped castings 4 or 5 feet in diameter are required and that they will be subjected to very little stress in service. The designer will unquestionably be able to estimate quickly the area of section required to enable the casting to stand up in service, but the section as designed, while strong enough, may be so thin that only with the greatest difficulty can the casting be poured; accordingly, it should be made heavier.

Thin Patterns of Wood May Warp—In the example just cited, there is an additional fact to be considered that if only occasional castings are required the pattern obviously will be made of wood, so that in spite of the fact that the sections have been thickened in order to permit successful pouring of the casting, it easily may happen that the pattern is still so thin that it will warp before it is used again. Manifestly the section should be further thickened to take care of this factor, for it would be cheaper in the end to increase the section than to make a new pattern.

Feeding Through Thin Sections to Heavier Gives Unsound Castings—A hub-like pattern may be very intricate, and of such a character that commercially and practically it must be gated on a flange that may be too thin as designed to permit of the use of gates thick enough to allow for proper feeding, even when feeding heads are used at available locations. A slight increase in thickness of flange would admit of the use of the proper size gates and the production of a sound casting. At the least, a local thickening of the web for the width of the gate should be permitted, provided this would not interfere with the assembling of the casting.

Design for Sound Casting—In the case of malleable iron castings, soundness is of much more importance than in castings of other materials, for the reason that wherever there is a shrink there will be found a hard spot, with the result that machining difficulties will be encountered. The designer should afford the foundry every opportunity possible to secure soundness, and manifestly something is wrong with

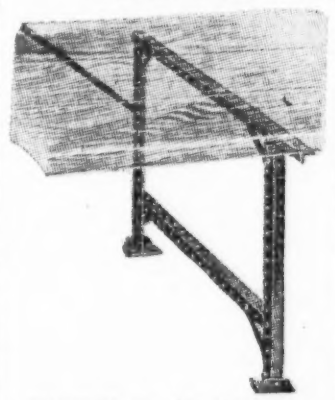
Continued on Page 11)

DODGE ISSUES FIRST EDITION OF SERVICE PUBLICATION

The first edition of a new service publication, Dependable Service, has been issued by Dodge Brothers, division of the Chrysler Corporation. It is a four-page leaflet printed on 8½x11 stock.

The object of the publication, according to D. T. Stanton, director of service, under whose supervision it is prepared, is "to pass on successful merchandising ideas which other dealers have used, to acquaint the dealer with the latest methods of maintenance and repair and to act as a general clearing house for news relating to service."

AURORA MAKES NEW STEEL BENCH LEG



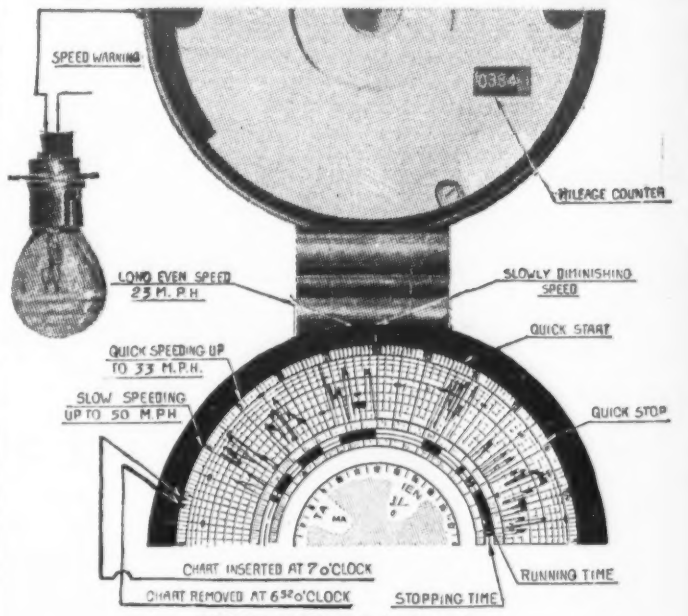
EQUIPTO No. 843 bench leg

An adition to the line of the Aurora Equipment Company, Aurora, Ill., is the new Equipto No. 843 bench leg. The uprights are made of 1¼x1¼ inch angle steel, in 30½, 33 or 35-inch heights. The top member is 28 inches long and the bottom member 24 inches long. The price is $1.50; extra bottom member 25 cents.

NIL MELOIR ANNOUNCES NEW ACCESSORY ITEMS

New equipment items announced by Nil Meloir, New York city, include wheel discs, Smith flush type cigar lighter, exhaust horn for mounting on the running board as well as one for mounting under the car, which is said to sound like a boat siren.

Ohmer Instrument Records Speed, Stops and Idle Time



OHMER-KIENZLE tachograf

The Ohmer-Kienzle Tachograf has been recently added to the line of recording devices manufactured by the Ohmer Fare Register Company, Dayton, O.

The new instrument is claimed to furnish an accurate record of the actual time a motor vehicle is in operation, the idle time, and the number and length of all stops as well as a record of the speed traveled while the vehicle is in operation.

The record is made on a large twenty-four-hour chart, which is moved under two styluses by a six-jewel, eight-day clock movement.

The instrument also incorporates a visible mileage odometer.

A feature of the device is a warning mechanism which may be connected to a horn, bell or light to warn the driver when a predetermined safe speed is reached.

GOODRICH ANNOUNCES TUBELESS TIRE FOR TRACTORS

Akron, O., July 14.—A tubeless tire which is claimed to have more cushioning effect and greater tractive ability than either pneumatic or solid tires has been developed by the B. F. Goodrich Company for industrial and agricultural tractors.

The tire, which is not under air pressure, has been named by Goodrich the Zero Pressure tire. Its construction is a rubber arch built on a perforated steel base for application to standard solid tire wheels. The piers of the arch are of sufficient size and rigidity to provide ample load capacity. The all-rubber arch or tread is made flexible to give full tread contact under the comparative light loads of tractors, and, through this flexibility and full contact a traction, which exceeds that of either solids or pneumatics is provided, it is stated.

Goodrich is making the tires in 34x7 and 46x11 sizes, and other sizes are planned.

GETS STATE CHARTER

Stonington, Conn., July 14.—Santin Chevrolet Company has been incorporated. Sebastiano, A. J. and J. S. Santin, all of Mystic, are the directors.

CUMULATIVE NEW PASSENGER CAR

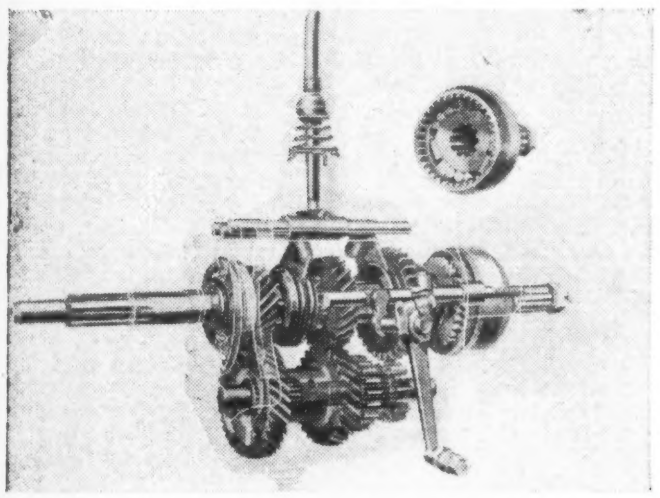
In this table 10 states and the District of Columbia **Returns for today: Minnesota, Montana, South**

States	Auburn	Austin	Buick	Cadillac	Chevrolet	Chrysler	Cord	De Soto	De Vaux	Dodge	Durant	Essex	Ford	Franklin	Graham	Hudson	Hupmobile	La Salle
Delaware	5	1	47	4	200	20		3		6	6	10	162		1	5	2	2
Illinois	261	10	388	97	2979	416	21	191	35	368	15	229	3429	20	147	88	115	68
Maryland	54	2	118	15	1347	80	1	42	2	40	17	76	915	5	38	27	43	7
Minnesota	54	2	97	6	1651	112		47	10	85	11	85	923		62	39	33	8
Montana	7	1	27	1	241	29		22	4	19	6	9	186	4	3	7	1	2
N. Dakota	5	1	26		349	19		1	2	22	7	12	271		7	9	3	1
S. Ca'lina	14	2	40	1	670	42		22		32		20	537		1	14	10	4
Utah	11		20	5	278	9		10	10	27	3	27	213		10	10	5	1
W. Va.	28	4	43	6	686	84		29	8	83	1	41	608	1	32	20	14	4
Wisconsin	76	2	175	13	1278	117	7	70	35	124	16	107	885	3	37	36	25	12
Dist. of C.	40	4	124	12	833	56	1	50		67	6	44	935	3	25	11	34	11
Totals	555	29	1105	160	10512	984	30	487	106	873	88	660	9064	36	363	266	285	120
Dela., '30	1		46	11	189	35	1	5		5	11	13	348	1	7	6	10	5
Ill., 1930	68		656	61	3117	490	26	298		449	71	314	6752	58	232	167	217	88
Md., '30	12		131	7	1066	83	1	24		69	18	99	1429	4	72	31	45	11
Minn., '30	7		93	6	1725	139	3	43		92	23	69	2789	2	93	35	53	14
Mont., '30	5		27	3	270	26	2	29		22	13	26	369	6	4	9	14	7
N. D., '30	1		23	1	590	47		8		35	23	23	831	1	17	12	2	
S. C., '30			34	1	389	16		23		20	2	26	799	1	5	15	9	
Utah, '30	9		28	5	324	34	2	31		42	45	35	586	2	33	17	9	3
W. Va., '30	6		60	2	805	63	3	35		129	29	69	1265	6	60	30	21	8
Wis., '30	19		208	14	1666	168	2	71		170	48	160	2591	14	96	71	36	6
D. of C., '30	11		68	7	431	32	1	18		33	13	46	1078	3	39	22	32	15
Totals, '30	139	*	1374	118	10572	1133	41	585	*	1066	296	880	18837	98	658	415	448	157

*Not in production

Equipment - - - Development

Free Wheeling Now An Option on Dodge 6s, 8s



PHANTOM of the Dodge transmission, showing the free wheeling unit at the rear of the transmission case just ahead of the propeller shaft brake. This "three-roller" type of free wheeling with the sliding collar clutch permits positive and selective free wheeling in all forward speeds

Detroit, Mich., July 14.—Dash-controlled free wheeling is available now as optional equipment, at $20 extra, on the new Dodge six and eight, according to A. vanDerZee, general sales manager of Dodge Brothers Corporation.

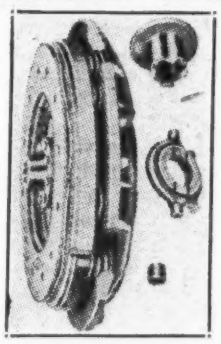
Simultaneously, announcement also is made of a new positive easy-shift transmission for the new Dodge six and eight.

The free wheeling unit is mounted back of the transmission and has a control button on the dash. When this button is in, the transmission is in free wheeling position; if it is out, it is in conventional gear.

Contrary to the general belief of many, according to Mr. vanDerZee, reverse gear is in no way affected by free wheeling. With the Dodge unit, when the transmission is in the free wheeling position and the driver wishes to back up, he can do so simply by declutching and putting the transmission in reverse. In so doing he automatically releases the free wheeling unit, thus putting the transmission into conventional gear.

"The new Dodge positive easy-shift transmission is in every phase of construction a purely Dodge Brothers development and does not employ the use of synchronizing cones, discs or plates. It is very simply constructed and, since it does not consist of any additional parts, there is nothing to interfere with or prevent it from operating as designed. "Furthermore," Mr. vanDerZee said, in conclusion, "its simplicity eliminates the necessity of added maintenance costs in achieving the thrill of easy shifting."

OVERSIZE CLUTCH FOR CHEVROLET CARS



A new oversize clutch for Chevrolet cars is announced by the Accurate Parts Manufacturing Company, Cleveland, O.

The new clutch is a 10-inch unit and replaces the 9-inch clutch and provides 15 square inches additional frictional contact area. The price is $15; $5 is allowed for the old cover plate.

QUICK HITCH BUCKET FUNNEL

QUICK HITCH bucket funnel

The Quick Hitch bucket funnel is a new shop convenience for draining containers which are closed with a drain plug. It is manufactured by the Consistometer Corporation, Chicago, Ill. It is claimed to be particularly applicable for crankcases and transmission draining.

In use the drain plug is loosened enough to permit turning with the fingers. The funnel is then held with the bucket hung on hook "A" in one hand directly under the drain. When the drain plug is removed, the free hand pulls the wire hook "B," thereby closing jaws "C." The jaws are then inserted in the drain hole and the wire hook released. The funnel and bucket hangs until draining is completed.

The funnel is 12 inches long, 5 inches diameter at the top and 1 inch diameter at the bottom.

OPENS NEW REPAIR SHOP

Elmwood, N. J., July 14.—George Leek, Inc., White Horse Pike, has been formed to conduct a general garage, to repair and sell automobiles, parts and accessories.

Characteristics of Flame

By PROF. A. E. BAENDER
Oregon State College

The following is a paper presented recently before the Oregon section of the Society of Automotive Engineers at Portland, Ore.:

Combustion is ordinarily understood by engineers to mean the chemical union of a combustible (fuel) and the oxygen of the air. Accordingly, we recognize three degrees of combustion in so far as the speed of the reaction takes place. If the union of a substance, such as iron, with oxygen is slow enough, it is called rusting; hence very slow oxidation or burning is commonly called rusting.

If the reaction proceeds faster, producing flame, as in the oxidation of wood or coal, it is called burning, while, if the oxidation proceeds with great rapidity, it is called an explosion. Unfortunately there is not a sharp line of demarcation between these three general divisions, hence, as engineers, we sometimes call a burning process an explosion, and others might refer to a mild explosion as a rapid burning.

There have been many definitions advanced concerning what a flame really is, and since there are many concepts concerning the fascinating study of flame, the author feels that the definition of flame may be held back until after the study of some of the peculiarities of combustion have been made.

It is agreed by every one, perhaps, that combustion may be defined as a chemical combination—or as a series of chemical combinations—between a fuel and oxygen. The oxygen here referred to need not come from the air, nor need it be a part of the air, as oxygen can be secured from many sources other than air. However, by far the cheapest and most easily obtained supply of oxygen is in the air.

If we consider the mechanical make-up of air, we find that it is composed of oxygen and nitrogen in the proportion of about seventy-nine parts by volume of nitrogen and twenty-one parts of oxygen. There are a few aditional gases in the air, but they are so small in amount that they are not considered in ordinary engineering calculations.

With this in mind, it is interesting to consider the elementary theories concerning combustion and the development of the flame theory.

Practically the only combustible materials with which the engineer is concerned are carbon, hydrogen and combinations of these two. When we deal with their chemical combinations we call them hydrocarbon groups, or, more specifically, our natural gases, petroleum oils and coals.

The most abundant single element in the entire list of fuels is carbon. Carbon occurs in practically every body of fuel which we burn. It is the main element in coal, oil and gases. It combines readily with oxygen to form two compounds or gases. These are called carbon dioxide and carbon monoxide. With either combination it is possible to produce flame, likewise it is possible to combine them without flame. If the correct proportions of carbon and oxygen are maintained during the combustion of carbon, then the resulting product will be carbon dioxide. However, by reducing the amount of oxygen available it is possible to produce a product known as carbon monoxide.

If the aim is to produce as much available heat as possible from a given quantity of carbon, then the conditions should be so maintained that the correct supply of oxygen is available for the proper combination with the carbon. When one pound of carbon is burned to carbon monoxide there is liberated only about 4,500 heat units, whereas when the pound of carbon is burned to carbon dioxide, some 14,450 heat units are liberated. In so far as our study of flame is concerned, it is of vital importance to know which method of burning is being accomplished, because of the great variation in the resulting flame temperature as well as many other of its characteristics.

Unfortunately it is not commercially feasible to use any other supply of oxygen than that contained in the air, and, as has been mentioned, air contains about 79 per cent. by volume, the inert gas, nitrogen. Hence when air is used for combustion, it is necessary to supply sufficient air so the correct amount of oxygen is available. This means, then, that it is necessary to supply about four times the volume of air in order to have sufficient oxygen, whereas, could oxygen alone be supplied, three-fourths in volume would be sufficient.

Since the nitrogen takes no chemical part in the combustion process, it follows that provision must always be made for so much "dead timer" in all our calculations in combustion with air. A notable exception to this is found in the oxy-acetylene welding flame, wherein no noticeable amount of nitrogen is present. Likewise it is to be observed that extremely high temperatures are obtainable with such a combination of a gaseous fuel and pure oxygen. Also entirely different flame characteristics are encountered.

It is not unlikely that most of us have certain notions concerning the meaning of the word flame. Webster says flame is a fire, to heat blaze, but such a definition does not suffice for our consideration. It is rather difficult to define flame so precisely that no exceptions can be taken. However, it is felt that perhaps a satisfactory definition might be as follows: "Flame is a visible evidence of combustion having a definite appearance and motion." It is usually stated that a flame is the result of highly incandescent particles moving along in the current of heated gases. If we accept for the moment, the above definition, we must agree that a long flame must have a different "set" of such highly heated particles from what must be present in a short flame. Also it is observed that a long flame is yellow in color, whereas a short flame is blue, in fact it is usually possible to change a long, yellow flame into a short, blue flame by proper control of the air and fuel supply, or, as is stated in engenering language, to control the fuel-air ratio.

We recognize, therefore, that both the chemical and physical charac-

(Continued on Page 10)

REGISTRATION STATISTICS, JUNE, 1931

Carolina, Utah, West Virginia, District of Columbia

States	Lincoln	Marmon	Nash	Oakland	Oldsmobile	Packard	Peerless	Pierce-Arrow	Plymouth	Pontiac	Reo	Studebaker	Whippet	Willys	Willys-Knight	Miscellaneous	Totals
Delaware	1	1	11	5	16	6		2	6	30		7		4	2		565
Illinois	33	8	192	74	560	130	24	26	145	585	22	303	1	213	34	14	11,241
Maryland	7	3	90	33	48	26	10	9	55	167	10	63	4	49	7	2	3,412
Minnesota	3		37	17	99	13		4	155	219	5	64	4	144	9		3,998
Montana		1	16	7	13			1	21	36		8	2	24	2		700
N. Dakota	1	1	13	3	10				32	41	3	9	3	33	5		889
S. Ca'lina	1		3	2	16	3			24	35	2	10		7			1,512
Utah		2	15	5	13	2			3	17	1	11	1	10	1		720
W. Va.	5	1	23	19	40	8			84	103	11	40		91	2	1	2,120
Wisconsin	4	4	149	34	102	24	2	3	97	224	11	102	5	112	12	3	3,906
Dist. of C.	6	7	47	18	66	25		6	30	107	2	78		28	6	1	2,683
Totals	61	28	596	217	983	237	36	51	652	1564	67	695	20	715	80	21	31,746
Dela., '30	1	1	3	5	4	17		2	22	29		9	3	6	1	1	798
Ill., 1930	46	72	405	97	446	323	13	42	543	409	38	422	82	186	88	63	16,339
Md., '30	4	11	66	32	59	57	1	8	111	98	12	73	36	37	16	24	3,747
Minn., '30	3	12	76	37	104	32	1	2	392	181	13	116	67	124	26	7	6,379
Mont., '30		5	25	11	9				37	33	4	15	16	13	5		1,005
N. D., '30		3	43	14	21	1			78	52	3	21	39	53	9	3	1,954
S. C., '30	1	1	9	2	10	9			16	16	2	8	3	2	1		1,420
Utah, '30		7	17	16	21	12		1	22	19	3	23	4	2	2	3	1,357
W. Va., '30	2	23	41	32	40	28		3	118	91	5	46	45	76	16	5	3,162
Wis., '30	1	19	199	60	138	50	10	15	330	207	21	146	69	122	22	15	6,764
D. of C., '30	5	5	21	29	57	48	12	4	58	71	3	43	6	6	13	6	2,236
Totals, '30	63	159	905	335	909	577	37	77	1727	1206	104	922	370	627	199	127	45,161

Baender Discusses Flame

(Continued from Page 9)

teristics of a flame are dependent upon the method used for producing the flame. We further recognize the fact that as the flame is gradually changed from a long yellow type to a short bluish type, it increases immensely in temperature, does not deposit soot, has better burning qualities and does not produce smoke.

What, then, are the necessary adjustments to produce a blue, hot flame. If we agree that a short blue flame means a more rapid burning, it follows, therefore, that the shorter the flame, the more rapid has been the combustion. If we carry this reasoning to the limit we would conclude that with perfect combustion, at an extremely high rate, the flame should be of zero length.

The conclusion is warranted from many practical tests on the burning of goth gases and liquids without the production of any flame. True, there is a bed or "hot spot" of highly incandescent burning particles. However, no flame is visible. This process is known as "flameless combustion," or as "surface combustion."

The principle involved consists in providing a bed of granules of high refractory material and impinging the gas against this bed. Upon starting this reaction it is necessary to first heat the granules to a white heat, when it will be observed that the burning gas will enter the refractory bed and produce a very hot incandescent mass, which will continue to burn at an enormous rate without visible flame. This reaction is extremely interesting, because it makes possible the burning of extremely large quantities of gas within an extremely small furnace. Some years back the author was able to produce enough heat in burning ordinary city gas in a furnace only two inches in diameter and four inches long, to heat a seven-room home up to 70 deg. F., with zero outside. Much research work, however, remains to be done in order to fully establish all the peculiar characteristics and to fully commercialize the process.

If we assume, and it is very likely that the assumption is correct, that flame is the visible evidence of combustion, then it is interesting to consider various phenomena connected with the production of flame.

When any fuel unites with oxygen and the union does not occur too rapidly, there is visible evidence that combustion is being maintained. It is the small particles of incandescent carbon which are visible as they rise from the fuel bed. If the path of the flame is unobstructed and the flame does not strike a cooler object, then these particles will have sufficient time to burn to completion and the flame will be "smokeless." This simply means that the burning process has had time to consume all the carbon and therefore there is no soot.

In order to maintain good combustion it is necessary that the combustible material and the air be mixed in the proper quantities and also thoroughly mixed. The chemistry of the reaction determines the relative amounts while the type of mixing device determines the thoroughness of the mixing.

Thus if a fuel is finely divided and intimately mixed with the correct amount of air, it should burn with enormous speeds. In fact, the burning would be so rapid that no flame would exist, since there would be no incandescent particles carried upward with the heated gases.

Let us consider the action of the burning of gasoline and air within a cylinder of an automobile engine.

The carbureter is the instrument which measures out the correct amount of gasoline and distributes it in the air stream. The intake manifold continues the mixing, as does also the inlet valve opening.

Depending upon the correct fuel-air ratio, there will be slow burning, medium burning or very rapid burning. Also as the fuel-air ratio is varied there will be different efficiencies. Most carbureters are adjusted about 25 per cent. too rich. With a lean adjustment there will be much flame within the cylinder, which indicates slow burning and consequently poor efficiency. As the adjustment more nearly approaches the fuel-air ratio as dictated by chemical equation, the speed of burning increases rapidly and the flame decreases in like ratio.

With increased speed of burning, much higher temperatures are attained and also higher efficiencies. These higher temperatures add power to the engine and generally improve its performance. The correct adjustment of the carbureter for best operating conditions is determined not by the judgment of the person who is making these adjustments but by the careful chemical analysis of the products of combustion. This determination is called "gas analysis" and is done with an Orsatt apparatus.

Correct carbureter adjustments are determined by the percentage of CO_2, CO and O_2 in the exhaust gases. This is the only accepted scientific method for correctly determining the correct fuel-air ratio.

It is generally accepted by automotive engineers that the compression ratio could be increased without putting undue strain upon the working parts. Any increase in compression ratio is directly reflected in increased efficiency. Calculations will show the following:

Comp. ratio	Calculated thermal eff.
4-1	33.7%
5-1	38.0%
7-1	44.0%

If compression ratios could be raised from 5:1 to 7:1, it is estimated that the increased efficiencies would result in a saving of several million dollars annually. There is no subject which combines more scientific and practical interest at the present time. Recent research has taught us how little we know of the nature of flame within a cylinder and of the gaseous reactions that take place at high temperatures.

Unfortunately as we increase the compression ratio "knocking" sets up and destroys more than the good accomplished. We are still searching for a method to control flame propagation or rate of combustion, such that knocking can be eliminated even at 7:1 ratios. The necessary condition seems to be one of preventing rapid combustion. Modern theories tend towards the idea that "knock" is due to the spontaneous ignition temperature by the expansion of the already combined gases. It seems that any reduction of the temperature of the mixture will reduce the tendency to knock. Thus elimination of the hot air store will help reduce "knocking."

The addition of excess air, or in other words, using a leaner mixture, helps to reduce "knocking." Knock is also more noticeable when heat conduction is poor, such as a cylinder full of carbon or a cylinder so large that the central piston portion cannot remain cool.

The tendency to "knocking" is not a property of all fuels. The straight gasolines are the worst offenders, whereas the cracked gasolines are comparatively free under ordinary conditions. "Knocking" may be diminished by adding benzol, which has the effect of slowing up flame speeds.

In 1922 Midley announced the important discovery of anti-knocks, or substances which when added to gasoline in small quantities have the effect of suppressing knocking. The following table shows the proportion by volume of these substances which, when added, have the same effect as 25 per cent. Benzol:

Compound	Corresponding % by Vol.
Benzol	25.0
Ethyl Iodide	1.6
Tin-Tetra Ethyl	1.2
Di-ethyl Telluride	.1
Lead-tetra ethyl	.04

Since Midley's discovery of anti-knock compounds, many theories have been advanced to explain the action. Obviously their effect can not be justified on purely thermal grounds, for they are never present in sufficient quantities to lower the temperature of the flame. Also, their presence does not seem to reduce flame velocities.

Perhaps the best suggestion for the anti-knock characteristics of tetra-ethyl lead is that the lead liberates free metallic particles which function as catalysts, and themselves undergoing rapid oxidation, produce a large number of exidations centers. In this way a homogeneous combination throughout the gas mixture ahead of the flame front might occur. This, of course, would suppress knocking.

The temperature of a flame depends upon many factors. In order to produce high temperature, burning must be rapid and radiation losses must be small. Further, there must be the least amount of air supplied that will suffice to completely burn the fuel. Any excess of air will lower flame temperature. We are interested in high flame temperatures in many fields and therefore much study has been done in this field.

When the hydro-carbon (CH) group burns completely the products of combustion are carbon dioxide and water, and, of course, the nitrogen which is in the air will be with them.

When a certain definite temperature has been reached, a peculiar situation arises. The carbon dioxide and the water vapor begin to dissociate—that is—the carbon dioxide will separate into carbon monoxide and free oxygen, likewise the water will separate into free hydrogen and free oxygen.

This separation of these compounds will extract as much heat from the hot gases as was obtained or liberated during their burning. Hence, when certain temperatures are reached—called maximum flame temperatures—the rate of dissociation just equals the rate of burning, and it is impossible to obtain higher temperatures. Thus nature provides a method which prevents the attainment of the high temperatures that could be obtained if a fuel, when once burned, would stay burned.

Dissociation of burned fuel has a very definite and harmful influence upon the operation of an internal combustion engine. This can be understood by the following consideration.

Dissociation is a function of temperature only. If, after a fuel is burned and a certain percentage of dissociation has taken place, the products of combustion—carbon dioxide and water—start to cool, reburning or "after burning" begins, and ultimately the burning will go to completion.

Let us consider the moment within a cylinder just after the spark has ignited the mixture, and the piston is proceeding on its power stroke. Due to the rapid increase in the temperature, a portion of the carbon dioxide and water will dissociate. This means that there will be some free carbon monoxide, oxygen and hydrogen in the highly heated gases. As the expansion continues and the temperature drops, these free gases, carbon monoxide, hydrogen and oxygen will recombine into carbon dioxide and water.

Therefore as the xhaust valve opens these burning gases will pass out into the exhaust manifold, heating the exhaust valve as well as carrying much heat to waste. It is likely that this action of dissociation with the after-burning is the logical explanation of the cause of many burned exhaust valves and red hot exhaust manifolds.

Recent tests at the college have shown that this is likely to be true and further research along this line will be carried on. There is much research necessary on the development of scientific knowledge pertaining to flame. As yet, we are much in the dark concerning many of the phenomena of flame actions. However, we do know enough to guide us in the design of many of our combustion apparatus.

In heating problems, we are concerned in the production of flames of high temperatures because with such conditions we can transfer much more heat into the water or heated air than can be done with such low temperature flames. This is largely due to the fact that with high temperatures much heat is transmitted by direct radiation and this is considered by far the most economical as well as the fastest method.

It is a curious fact, but a flame directed against a cool object such as a boiler tube filled with water cannot be made to touch the metal. There is a layer of stagnant air about 1-40th of an inch thick against which the flame impinges, but it cannot be made to travel through this layer of air and touch the metal. It is fortunate that this is true, otherwise, we would be unable to lubricate the cylinder walls of our automobile engines. The lubricating oil which is against the cylinder wall does not reach a temperature appreciably higher than the water within the water jacket.

In order to overcome as much as possible the evil effects of this stagnant air film next to the metal wall and thus encourage heat transfer, it is necessary to give a great velocity to the flame and heated gases, so they will sweep away as much as possible this inert layer. For this reason we find high velocities in the gases passing through a boiler, so that a quick heat transfer may be accomplished.

Contemporary Comment

(Continued from Page 2)

sure tire of equal capacity, both of which factors enhance its cushioning properties. Since protection to the road is also protection to the vehicle, this comparison has a major economic significance. The road strikes the vehicle wheel just as severely as the wheel strikes the road.

Only 15 per cent. greater pavement thickness is required to support a 7½-ton balloon-tired truck than for a seven-passenger car. If cushion and solid tires were used and the truck operated at 20 miles an hour, a greater thickness of slab would be necessary, averaging 31 per cent. for cushion tires and 42 per cent. for solid tires greater than the minimum practicable thickness required for seven-passenger automobiles. The impact reaction after passing over a 1½ by 30-inch inclined plane and a 1½ by 12-inch rectangular obstruction in all tests was decidedly less where single balloon tires were used, with dual balloons second and high pressure tires the greatest.—**India Rubber World.**

* * *

AS the decline in commodity prices has been checked temporarily, at least, we may be at a turning point in so far as raw materials are concerned. Nothing could be more desirable as an indication of approaching business recovery. It is well to remember, however, that commodity prices may be at a permanently lower level than in 1923-1926.

Post-war deflation has considerably reduced the ratio of money and credit in circulation to the volume of transactions requiring the use of money and credit. Throughout a large part of the world, credit has been deflated and business has been placed approximately on a gold basis. This, of course, means an increase in the purchasing power of the dollar or other money unit, and a lower commodity price level.

Again, there has been a large gain in economy of production. Not only have raw materials fallen much more than finished goods, but wages and interest rates have been reduced and the inflated "overhead" expenses of 1928-1929 have been greatly curtailed. The amount of further deflation of credit which may come is uncertain, but the trend is still strong toward reduced costs of production.

It is little short of remarkable how producers have revised their ideas as to production costs (e.g., cotton and copper).

Following the announcement of the proposal for a postponement of inter-government war debt payments, a considerable spurt in commodity markets occurred. We should note, however, that the moratorium proposal contained a recognition of the decreased purchasing power of debtors and of the existence of a lower price level. Concessions to Germany are partly based upon the increased difficulty of paying a given sum in gold.

Prior to the moratorium proposal, however, there were signs that the decline in raw material prices had been checked. It was becoming increasingly evident that many commodities were selling at or below cost of production, and this was resulting in increased efforts to curtail output. Prices have become so low that further reductions would both drive out surviving high-cost producers and force wage reductions on organized labor.—**Dr. Lewis H. Haney, N. Y. U., in the Iron Age.**

* * *

THE service station business is constantly attracting owners, managers and salesmen of increasingly higher caliber from all lines of human endeavor, but Los Angeles claims the distinction of having an operator from the high places in military service.

He is William Charles Cannon, graduate of the United States Military Academy at West Point. His station is located at East 9th Street and Telegraph Road. Bill Cannon is a native of Los Angeles, but spent many of his earlier years in Honolulu, where his father was stationed as quartermaster sergeant in the United States Army.

After completing his course at West Point, where he was active in football, Bill spent two years at Cornell University, then returning to Los Angeles and obtaining a groundwork training in oil marketing.

When he decided to "go on his own," he opened one of the most attractive stations in his section of the city, all of the structures being designed and erected by the Pacific Steel Building Company of Los Angeles.

When it comes to the service station business, Manager Bill Cannon thinks military training is a valuable adjunct. He says:

"Back at West Point every man has order, system and cleanliness drilled into him constantly as part of the duties of a cadet, until these things get to be his second nature. I find this training can all be applied to the service station business, and I'm strong for Pacific Steel Buildings because they are neat looking, efficient to work in, and easy to keep ready for inspection."—**Service Station News.**

Engineer and Foundry Co-operation Need

(Continued from Page 8)

a pattern when every possible expedient is used to bring about this end and it is found to be impractical commercially.

Square Corners Should be Avoided—The outer circumference of thin flanges should not be made with square corners if this can be avoided. It must be borne in mind that the castings as initially cast consist of brittle white iron and are in a state of strain; so that a sharp corner may readily develop a minute check that will extend into a crack, particularly in the vicinity of the gates where the metal cools last. In cases of this kind, losses due to cracks will be greatly lessened if the corners are slightly rounded off.

Advantage of Uniform Section Thickness—The designer frequently ignores the fact that a thin section will cool in the mold much faster than one that is heavier, which in turn means that the metal in each is passing through its critical temperature range at different intervals of time, so that one section is contracting while another is expanding. The strains thereby set up may cause the foundry a prohibitory loss due to cracks. While disproportionate sections are impossible to avoid, it frequently is possible to even up section thicknesses by making the heavy one slightly thinner and the lighter one slightly heavier, giving in the end a stronger casting without increase in weight. The designer should realize that frequently a casting actually is made up of various parts, each of which consists of a separate casting joined to its neighbor by a connecting section of metal. The thin section, cooling more quickly, will draw metal from an adjacent heavy section and porosity of metal, if not a serious shrink, may take place in a very vital location.

The bane of the founder's life is the pattern of disproportionate sections; and, while it is realized that this condition is sometimes unavoidable, it frequently happens that the situation could be improved greatly through certain modifications that not only would serve to make the casting more reliable, but facilitate the work in the foundry.

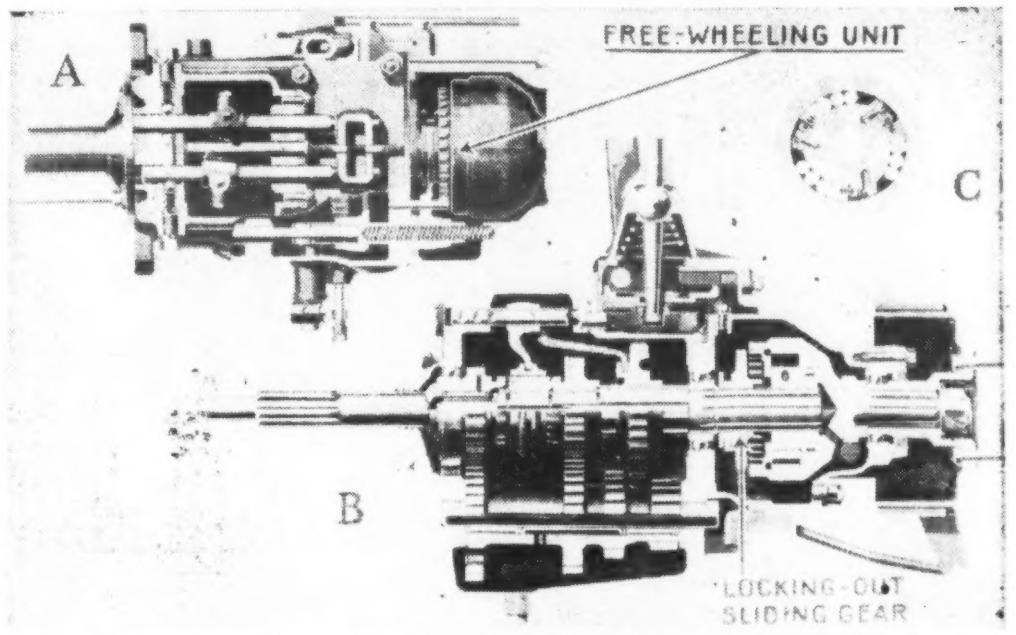
Generous fillets should be used where possible and sharp corners avoided, the latter being not only a source of weakness, but preventing proper cleaning of the casting.

Dry Sand Cores—When practical, castings should be so designed as to avoid the use of dry sand cores. Even those that are made of the weakest mixture will offer much greater resistance to the iron as it starts to contract after solidification has started than a core of green sand, which will collapse when subjected to the slightest pressure. There is a certain narrow range of temperature during solidification within which white iron is extremely tender, and if on passing through this range the iron meets resistance, the loss due to cracks will be very heavy, especially if the core forms the interior surfaces of the casting. The situation is not so serious in other cases, as for instance where a core is used to form a projection on an exterior surface.

Faulty Design Delays Production—Complaints frequently are made that it takes the foundry too long a time to submit a sample casting from a pattern furnished. When this occurs, it will be found generally that the design is so faulty in some of the details mentioned that many trials have been made as to gating and other factors before some suitable method has been found that will insure freedom from shrink on the one hand and a prohibitory loss, due to cracks, etc., on the other.

Through co-operative effort better castings will be secured; there will result a saving of time to both manufacturer and foundry and unfortunate misunderstandings frequently will be avoided.

New Plymouth Transmission



FREE WHEELING and constant-mesh type transmission are combined in the new Plymouth. Figure A, a top sectional view, shows the free wheeling unit with locking-out sliding gear disengaged. Figure B shows side cross section of transmision and free wheeling unit. Figure C is cross section of free wheeling clutch showing three sets of three rollers each between outer ring and cam surfaces.

Differential Discussions

IN this column Automotive Daily News is glad to present the opinions of its readers on topics related directly to the automotive industry. Automotive Daily News, however, must disclaim responsibility for such opinions.

All questions regarding merchandising, technical problems or other information pertaining to Automotive Industry will be answered without charge in this column.

Would Restrict Allowances To Red Book Values

Automotive Daily News: Recently there has appeared in your paper several articles about the menace of wild trading by automobile dealers, but so far you have failed to offer a sound solution and, after all, the solution of this problem is the only thing that means anything.

To me the solution is simple and here it is—that the manufacturers join together in an iron-clad agreement that they will require every distributor and every dealer to adhere strictly to the Red Book or some recognized publication as to the values published in the said book on used cars, and let these values be carefully set, and when I say carefully set I mean set in such a way that when a dealer takes in a trade-in on the appraised value of the book THAT VALUE will be such as to give him an opportunity to sell the trade-in at a profit. Fix the penalty on any distributor or dealer found to violate this rule as the immediate loss of the franchise.

It is my opinion that 99 per cent. of the dealers throughout the country would welcome such a restriction because they know better than you and better than the manufacturer the grave menace of wild trading and down in their hearts they despise it more than any one else and the only reason they do it is because they cannot help themselves unless they are given the kind of protection herein provided for them.

In a recent article in your paper it was suggested that the dealers co-operate among themselves to eliminate wild trading. Frankly speaking, such an idea is ridiculous for the simple reason that it only takes one dealer in a community of average size practicing wild trading to spoil the business for every other dealer and the reason for this is entirely too obvious to waste your time and mine going into.

In this community I know of a dealer handling what I consider one of the soundest values in automobiles who recently, because of competition, allowed $900 on an automobile that I would not have paid more than $400 to retail. I know of another dealer who allowed $150 on a Model T Ford on an automobile that delivers for less than $1,100. The Model T Ford was worth exactly $6—the junkman's price in this community.

Now that I have given you what I consider the solution to the problem, I will tell you what, in my opinion, has caused the problem to assume such substantial proportions—the manufacturers' forever trying to force the dealer organizations throughout the country to sell a maxixmum quantity of automobiles. A business is like everything else—you can force it just so much and keep it in a healthy condition, but when too much pressure is put on, something has got to give and the something that has given in the automobile business is your so-called "wild trades" and since the manufacturer is the fellow who started this bad business let him be the fellow to correct it and the result will be that good business men with capital to invest will again come into the automobile business and the business will again be on a sound basis, but until such a thing does happen the manufacturer will have to content himself with an inferior grade of selling organizations as compared with those of ten or fifteen years ago.

JOSEPH ADKINS, JR.,
Adkins, Inc., Atlantic City N. J.

PLUGS TESTED UNDER COMPRESSION WITH DEFIANCE DEVICE

A spark plug tester which tests spark plugs under compression has been developed by Defiance Spark Plugs, Inc., Toledo, O.

The tester, complete, consists of electrical connections for plugging into the regular current supply, coil, transformer, button switch, compression chamber, air gauge and needle valve with fittings to connect to the air line. It is available in either alternating current or direct current types. The price is $21.

Cumulative New Commercial Car Registration Statistics, June, 1931

Returns for today: Delaware, Maryland, Montana, North Dakota, South Carolina, Utah, West Virginia, Wisconsin and the District of Columbia

In this table, 9 states and the District of Columbia.

States	Autocar	Brockway-Indiana	Chevrolet	Diamond-T	Dodge	Federal	Ford	G. M. C.	International	La France-Republic	Mack	Reo	Sterling	Stewart	Studebaker	Whippet	White	Willys	Willys-Knight	Miscellaneous	Totals	States
Delaware	1		40				44		14		1	4						1			105	Delaware
Illinois	8	3	350	29	51	2	421	12	98		8	6	1	3	15			18		31	1056	Illinois
Maryland	14	6	162	8	20	2	190	11	50	1	7	15	2	1	9	1	9	1	1	13	523	Maryland
Montana			44		4		67	1	18			1						1		3	139	Montana
North Dakota			45		5		44	1	57		1	7			5	1		2		1	169	North Dak.
S. Carolina		1	104		9		86	2	4		2	1					2				211	S. Carolina
Utah			52		11		80	8	12		1	3			3		2	1		2	175	Utah
West Virginia		4	114	6	18		137	2	29	1	1	10	1		4		1	10		5	343	W. Virginia
Wisconsin			310	26	25	3	267	4	72		2	14	4	7	10	1	1	20		16	782	Wisconsin
Dist. of Col.	8		38	1	8		106	14	10		2	2	2				6	1		3	201	Dist. of Col.
Totals, 1931	31	14	1259	70	151	7	1442	55	364	2	25	63	10	11	46	3	21	55	1	74	3704	Totals
Delaware, '30		1	33		1		50	2	3		3	2		1						1	97	Delaware, '30
Illinois, 1930	1		442	58	45	4	590	28	110		9	18	2	1		6	8	5	2	56	1385	Illinois, 1930
Maryland, '30	8	14	112	5	12	3	237	17	30	1	27	5		3	1	1	18	5		7	506	Md., 1930
Montana, '30			45		4		78	4	16			1			1	1	1			2	153	Mont., 1930
Nor. Dak., '30			58		7		85	3	32			3			1	2		1	1	3	196	N. D., 1930
S. Car., 1930			90		2		163	1	4		2	1								6	269	S. Car., 1930
Utah, 1930			72		10		136	5	9		2	2					1			8	245	Utah, 1930
W. Va., 1930		3	112	2	14		189	20	39			5		1		2	5	3		7	402	W. Va., 1930
Wisconsin, '30		6	405	10	31	5	462	23	82		5	19	3	5	1	3	6	8		20	1094	Wis., 1930
D. of Col., '30	5	1	23	3	9		91	7	1		3	1	3				1			5	153	D. of C., '30
Totals, 1930	14	25	1392	78	135	12	2081	110	326	1	51	57	8	11	4	15	40	22	3	115	4500	Totals

Auburn Registration Increase

145.6%

for the first five months

(Automotive Daily News Tabulation, Issue of July 2, 1931)

When one make of motor car shows so marked a gain, there can only be one conclusion for thinking dealers.

The public knows motor car value. Now, more than ever, it is insisting on getting the greatest value. People are buying the motor car which careful comparison shows them, gives more automobile per dollar, than they have ever been able to buy.

Auburn's amazing gains arenot due to a few spectacular increases in large centers. Auburn's gains are being made everywhere; in cities and in territories where general business conditions have been reported the most unfavorable. Every Auburn distributor in the United States has sold more cars in the first 5 months of 1931 than he did in the entire year of 1930.

What does this mean to you? Just this! Regardless of the size of your community, or its present business conditions, the same opportunity may be open to you. Get a share of this success and put yourself in a position to benefit from Auburn's future growth. The amazing things Auburn is doing are merely a hint of the even greater accomplishments Auburn has in store. A factory's growing years are the most profitable years for a dealer. Let us tell you about the record profits Auburn dealers have made during the first half of this year.

AUBURN AUTOMOBILE COMPANY, AUBURN, INDIANA

AUBURN

POWERED BY LYCOMING